NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

THESIS

EXPLORATION OF THE DAMAGE STABILITY CHARACTERISTICS OF THE TRIMARAN SURFACE COMBATANT

by

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December, 1995

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REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE December 1995	3. REPORT TYPE AND DATES COVERED Master's Thesis

4. TITLE AND SUBTITLE EXPLORATION OF THE DAMAGE STABILITY CHARACTERISTICS OF THE TRIMARAN SURFACE COMBATANT	5. FUNDING NUMBERS
6. AUTHOR(S) Luis A. Ordóñez	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey CA 93943-5000	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.	12b. DISTRIBUTION CODE

13. ABSTRACT *(maximum 200 words)*

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14. SUBJECT TERMS Trimaran Frigate, General Hydrostatics, Damage Stability	15. NUMBER OF PAGES 131
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18 298-102

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EXPLORATION OF THE DAMAGE STABILITY CHARACTERISTICS OF THE TRIMARAN SURFACE COMBATANT

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Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN MECHANICAL ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL
December 1995

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ABSTRACT

The new world situation and important changes in the military policy of the United States have made it necessary to find new alternatives for warships. Affordability, high performance and excellent seakeeping, combined with a high degree of survivability, are essentials for the new century. The trimaran hull form holds promise in fulfilling future needs of Navy combatants. This thesis attempts to make an evaluation of the response of the trimaran hull under nine (9) different cases of damage stability. The specifications of the multihull correspond to a "4600 Tonnes Trimaran Warship" in the process of being evaluated by NAVSEA. Many analysis problems were encountered because of the unusual type of tumble-home hull and the "wavepiecer" shape of the bow. The results show an overall good response to a damage stability analysis. The critical case, unsurprisingly, has been found to be when one side hull is flooded and the tanks in the opposite hull are completely empty. Important conclusions and data were obtained, and future research areas are identified.

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ACKNOWLEDGEMENT

The author wants to thank Professor Charles Calvano for his expert guidance and excellent instruction during the course of this investigation.

Finally, and not less important, I want to thank the support of my wife Nydia and my newborn baby Luis Sebastián. Without them, this work and also my master studies would never have been accomplished.

I. INTRODUCTION

A. BACKGROUND

The overall purpose of this thesis is to study the damage stability of a new kind of war ship project: “The Trimaran Frigate”. In order to achieve this, a PC based program called “General Hydrostatics” (GHS) was used. It is used for general purposes and is able to handle any type of vessel.

This thesis is of current interest because the project of a “Trimaran” is actually being analyzed by the U.S Navy as an option for the 21st Century. An affordable ship with high performance is the requirement for the future, and results of previous studies made by the University College of London have demonstrated that the multihull warship could fulfill that requirement. Great advantages are the reduction of the horsepower installed, or an increase in the ship's velocity using the same power, good seakeeping and greater deck area to support helicopter operations. There is a greater survivability because the main hull center area, where the main equipment spaces are located, is protected by the side hulls.

B. TRIMARAN FRIGATE

The use of trimaran vessels in modern Navies is without precedent, and until now they have been primarily for sailing boats showing excellent conditions and performance. The history of this kind of boats comes from the double Outrigger Canoe, used by Pacific Islanders centuries ago. The first designs were floats of bamboo, replaced later by a wooden shaped float with greater characteristics of buoyancy and less drag resistance. Those boats were almost the first trimarans. The long and narrow main hull provided small drag resistance, and the side hulls supplied the necessary stability to complement the characteristics of the slender center hull.

In recent times, trimarans were used as small sport boats, and the results were very satisfactory. In 1960, the Nimble, a homemade trimaran, crossed the Atlantic showing excellent performance and seakeeping capabilities. [Ref. 1]

More recently, Royal Navy Officers at the University College, London investigated several trimaran ship variants, including: an Anti-Submarine Warfare (ASW) frigate, an offshore patrol vessel, a small aircraft carrier, an Anti-Air Warfare (AAW) destroyer, a corvette, a cross channel ferry and a Canadian coastal ferry [Ref. 2]. The possibilities for applications are various, but specifically, the present study is for the "Trimaran Warship." This is the first time that big ships with the trimaran configuration have been projected.

C. STABILITY CRITERIA

The U. S. Navy damaged stability criteria for underwater flooding come from the criteria developed by the former BuShips after World War II. The criteria depend on the length of the ship. Combatant vessels of more than 300 feet in length, like the trimaran frigate, must be able to withstand rapid flooding from a shell opening equal to 15 percent of the ship length at any point. Following this concept, the watertight bulkheads are positioned in a manner to assure fulfillment of this requirement. As a result of an unsymmetrical flooding, a maximum operational list angle of 15 degrees is allowed in calm water after damage. When there is a shell opening of 15 percent of the ship's length, it is possible to get a greater length of flooded compartments because there could be several adjacent compartments in between the shell opening. Adequate reserve of buoyancy is maintained, if the margin line is not submerged. The floodable length of a ship has become a convenient measure of reserve of buoyancy. [Ref. 3]

Damage stability and reserve of buoyancy are both very important indicators of the ship's survivability, but generally, damage stability could be more important because a ship without sufficient stability after damage will capsize, even though it may have enough reserve buoyancy to remain afloat [Ref. 4].

Because the fundamental assumption is that flooding of the ship will be rapid, intermediate stages of flooding are not considered. It is assumed unsymmetrical flooding represents the worst case.

The Trimaran Warship is a project in the process of being developed. In the future, it is possible that a new damage stability criterion could be used for this multihull, however, in this thesis in order to give a comparison criterion the standard "U.S. Navy Damage Stability Criteria" is assumed.

D. THE 4600 TON TRIMARAN MODEL

The model used in this thesis corresponds to the 4600 ton trimaran frigate developed by NAVSEA. The characteristics are shown in Table 1 and Figure 1.

	Overall
Displacement:	4600 LT.
Length	517.41 ft.
Beam	73.78 ft.
Depth	39.37 ft.
	Main Hull:
Displacement:	4530 LT.
Length (WL):	481.49 ft.
Beam (WL):	34.40 ft.
Draft:	15.43 ft
	Side Hull:
Displacement:	35.0 LT.
Length: (WL)	148.0 ft.
Beam: (WL)	5.8 ft.
Draught	4.7 ft.

Table 1. Trimaran Model Characteristics.

The form of the main hull uses "tumble-home", which is very unusual for conventional warships, and the bow is of the "Wavepiercer" type. This bow form is expected to decrease the drag force, but is an untried new concept for warships.

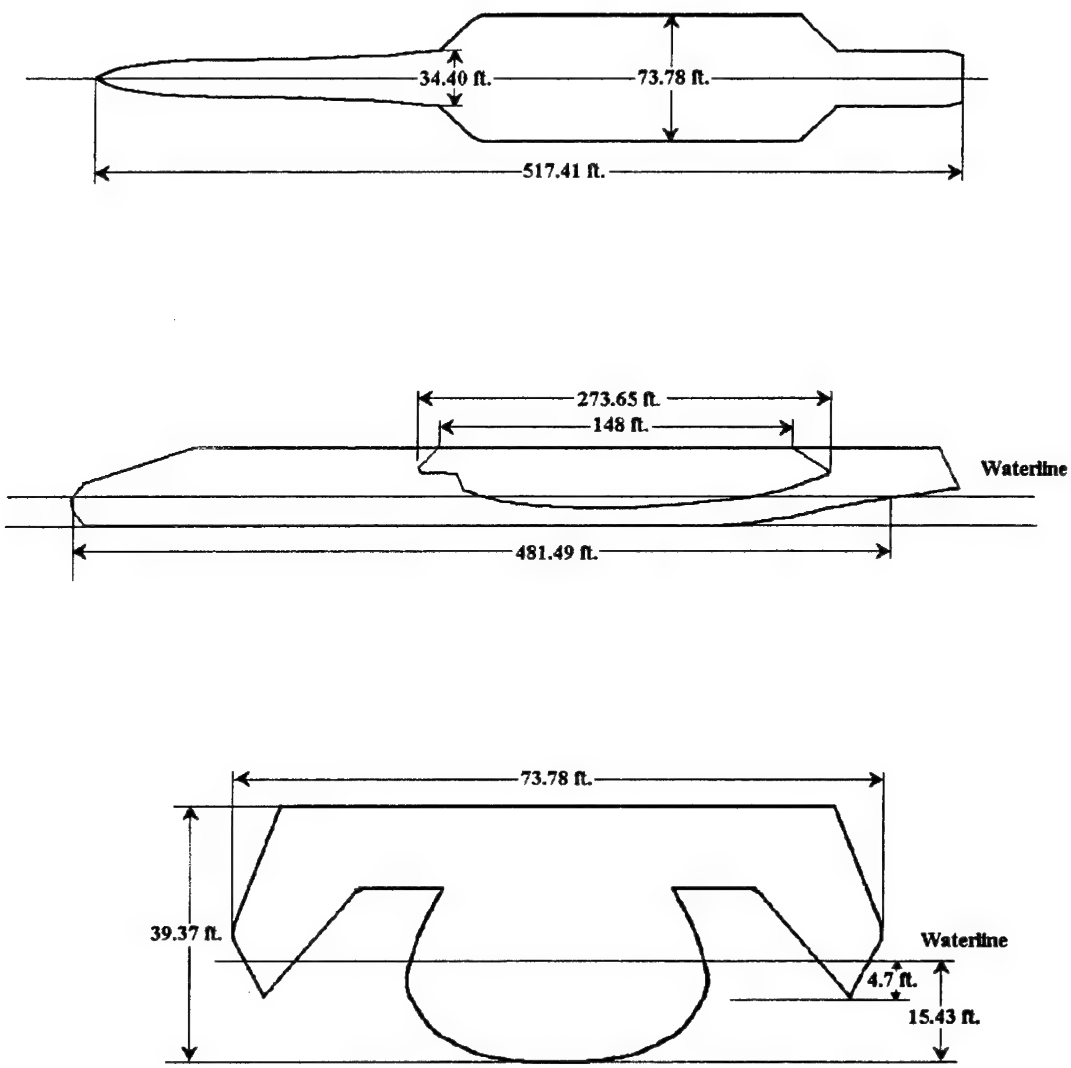


Figure 1. Trimaran Model Characteristics.

II. GHS PROGRAM

A. DESCRIPTION OF THE PROGRAM

1. Generalities

General Hydrostatics is a program developed for the personal computer. With it the user can approach hydrostatic analysis in a more direct, intuitive manner, in much the same way that hydrostatic analysis would be approached using a physical model, with the advantages of allowing changes and simulating situations and conditions at a very low cost.

The program itself is for general application; this means that it does not contain information about any particular vessel. According to the developers it is able to handle any type or size of vessel.

GHS is designed for use by naval architects. It includes tools for building mathematical models of any size and design vessel and for analyzing their hydrostatic stability and longitudinal strength properties.

2. Methods of Calculation

In order to become more familiar with the GHS program, in this section the method of calculation will be explained, based on the information obtained from the GHS program's manual. [Ref. 5]

The level of accuracy is controlled by the extent to which the model surfaces match the real surfaces. Usually the required number of stations to obtain good results must be between 25 and 30 in standard use. With between 40 and 50 a greater accuracy can be obtained (less than 0.25% error). In the trimaran model 45 sections were used. Figure 2, shows the final isometric projection of the trimaran hull.

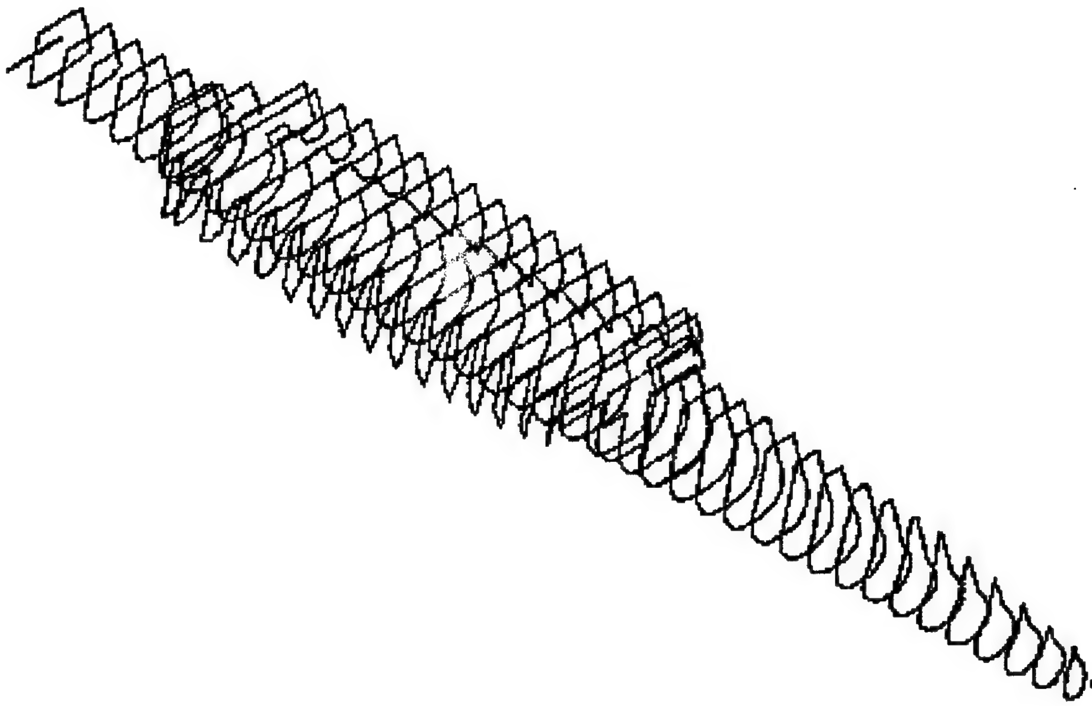


Figure 2. Isometric Projection of Trimaran's Hull.

All the calculations made by the program are based on trapezoidal integration. While trapezoidal integration is slightly less accurate than Simpson's method, it has the benefits of reliability, speed and the fact that discontinuities in the model require no special treatment. Intermediate abstractions such as Bonjean curves are not used.

The program solves the fundamental equations of hydrostatic equilibrium:

$$\sum Wi = \sum Bj \tag{1}$$

The sum of all weight forces must be equal to the sum of all buoyancy forces. The program does iterations until this equilibrium is reached.

The way to construct the model is component by component leading finally to the total integration of the components. The tanks' and compartments' contents can be modified to simulate flooding and then the program will make calculations with respect to stability and hydrostatic properties of the model. Figure 3, shows the side view of the trimaran model and Figure 4 shows an upper view of the model's hull.

It is important to understand a little bit about the structure within the vessel being modeled. There are three different kinds of parts: displacer, container and sail. The

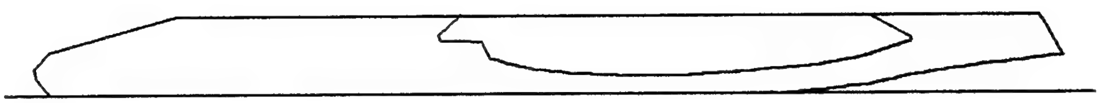


Figure 3. Side View of the Trimaran's Hull.

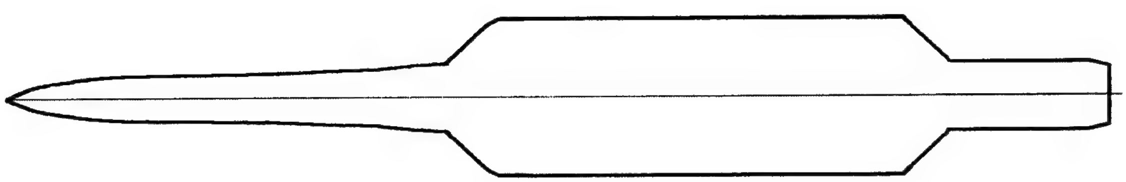


Figure 4. Upper View of the Trimaran's Hull.

model consists of one or more parts. Usually there is only one displacer part: the hull (buoyant part), some container parts (i.e. tanks or compartment parts), and some sail part (i.e. a non-buoyant additions to the side plane).

B. THE VESSEL MODEL

In order to make calculations the program needs a detailed geometrical description of the model including the internal compartments, tanks and parts.

The parts may consist of several components either for displacer or container parts. Those components could be, for example, the superstructure or thruster tunnels for the displacer, or internal components for the containers.

The components within a displacer part could be permeable like a piece of lumber on deck, and the component depends for its displacement on a value of effectiveness that is assigned between 0 to 1. In the same way the container components have permeability factors to allow for a more realistic simulation. Sail parts like displacement parts, may also have effectiveness factors [Ref. 5].

C. MODEL BUILDING

In order to construct the geometric model, it is necessary to define its parts. The hull definition was created using the data obtained from NAVSEA for the "4600 Tonnes Trimaran Project." This is a research project in progress at the present time. The offset data was converted for the GHS program and modified by hand, in order to obtain the data for the center hull. The data for the side hulls was entered point by point and section by section using the offsets data obtained from NAVSEA. The results were 29 sections obtained by using the program's "Fill" command, 16 more were created for the purpose of allowing the program to handle the model in a simpler fashion. See offset data in the Appendix. See Figure 5 for an illustration of the body plan of the trimaran model.

The coordinate system was disposed as follows: The origin was placed at the forward perpendicular on the ship's designed baseline and centerplane. The longitudinal axis is parallel to the ship's centerplane and baseplane and the transverse axis is perpendicular to the other two axes. The senses of the axes are: Longitudinal: positive aft of the origin; Transverse: positive to starboard; and Vertical: positive above the origin.

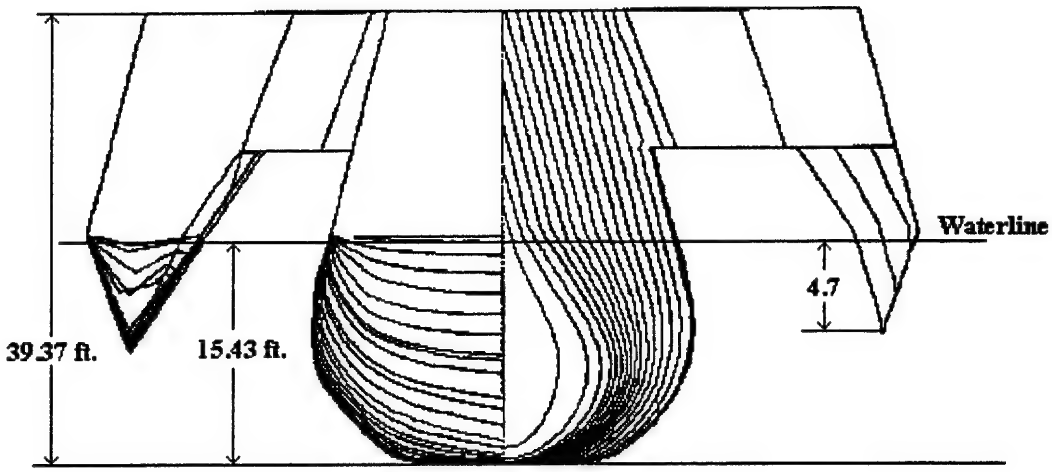


Figure 5. Trimaran Hull, Body Plan.

The coordinate system units are in feet. The overall model and every component is referenced to the origin point.

D. FLOODABLE LENGTH AND WATERTIGHT DIVISION

1. Factor of Subdivision

After the hull shape was obtained and the geometric file was corrected, the positions of the watertight bulkheads were calculated. For this purpose the standard subdivision factor of 0.5 was assumed. This corresponds to the capacity of the ship to survive with two compartments flooded. For this purpose the margin line was assumed to be 3 inches below the bulkhead deck, the permeability was assumed to be 98.5%, then the floodable length was calculated.

2. Watertight Compartments

Using the standard procedure for calculation of the distribution of the watertight bulkheads a total of 13 watertight compartments were obtained for the ship [Ref. 5, p.169]. In this way a minimum of two continuous watertight compartments could be flooded at the same moment and the ship could still maintain the buoyancy and the

minimal stability condition required in accordance with Navy criteria. Figure 6 shows the floodable length curve (data is shown in Table 2) and the position of watertight bulkheads (at the indicated distance from the bow). For the center hull, 13 compartments were arrived at. Ten watertight, small compartments were assumed for each of the side hulls. These compartments are assumed to be liquid storage tanks or small auxiliary machinery spaces. This way better protection against flooding is provided. Figure 7 shows the final internal distribution. The tanks information data is included in Table 3.

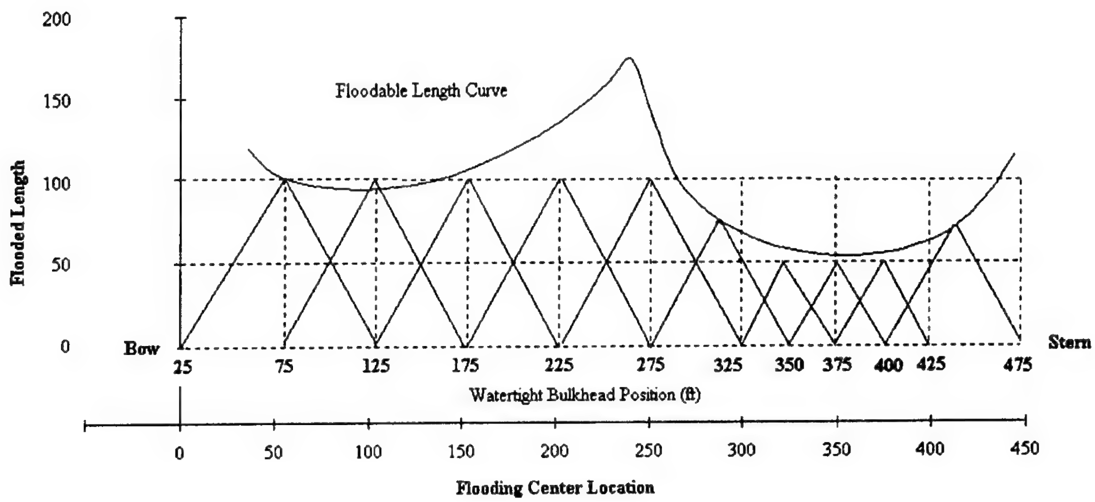


Figure 6. Floodable Length Curve.

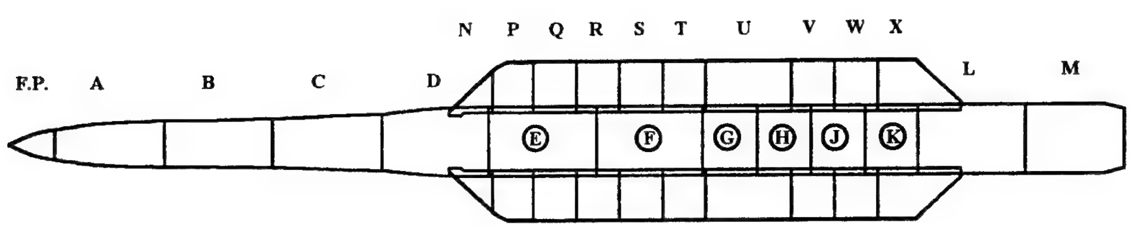


Figure 7. Final Internal Distribution.

ORIGIN DEPTH (ft)	DEGREE TRIM	FLOODED CENTER (ft)	FLOODED LENGTH (ft)	MARGIN (ft)	Gmt (ft)
37.49	-4.17	36.00	121.50	0.25	12.04
37.50	-4.15	48.00	107.13	0.25	12.19
37.51	-4.12	60.00	101.05	0.25	12.42
37.53	-4.07	72.00	97.98	0.25	12.74
37.55	-4.02	84.00	96.26	0.25	13.08
37.57	-3.97	96.00	95.85	0.25	13.47
37.60	-3.90	108.00	96.40	0.25	13.95
37.63	-3.83	120.00	97.91	0.25	14.46
37.66	-3.75	132.00	100.31	0.25	15.03
37.70	-3.66	144.00	103.64	0.25	15.64
37.74	-3.56	156.00	108.65	0.25	16.82
37.78	-3.45	168.00	114.56	0.25	17.33
37.84	-3.32	180.00	121.20	0.25	17.19
37.90	-3.17	192.00	128.88	0.25	16.87
37.97	-3.00	204.00	137.68	0.25	16.57
38.05	-2.80	216.00	148.11	0.25	16.21
38.13	-2.59	228.00	160.14	0.25	16.77
38.23	-2.35	240.00	173.78	0.25	15.10
25.72	-0.73	252.00	135.80	0.25	14.21
20.49	-0.12	264.00	102.67	0.25	13.01
18.44	0.12	276.00	85.75	0.25	11.49
17.20	0.26	288.00	74.62	0.25	11.26
16.34	0.36	300.00	67.00	0.25	11.32
15.71	0.43	312.00	61.66	0.25	11.33
15.23	0.49	324.00	57.75	0.25	11.29
14.86	0.53	336.00	54.97	0.25	11.21
14.55	0.57	348.00	53.64	0.25	11.20
14.28	0.60	360.00	53.50	0.25	11.53
14.05	0.62	372.00	54.70	0.25	12.29
13.86	0.65	384.00	57.28	0.25	13.01
13.70	0.66	396.00	61.84	0.25	13.63
13.55	0.68	408.00	67.81	0.25	14.04
13.45	0.69	420.00	78.66	0.25	14.13
13.38	0.70	432.00	94.21	0.25	14.01
13.38	0.70	444.00	116.25	0.25	13.91

Table 2. Results of Floodable Length Calculations.

DIVISION No.	COMPARTMENT NAME*	FWD END (ft.)	AFT END (ft.)	VOLUME (ft^3)
1	FOREPEAK.C	21.00 f	0.00	2652.27
2	COMP_A.C	0.00	50.00a	16332.20
3	COMP_B.C	50.00a	100.00a	27358.50
4	COMP_C.C	100.00a	150.00a	39154.20
5	COMP_D.C	150.00a	200.00a	52086.50
6	COMP_E.C	200.00a	250.00a	56536.70
7	COMP_F.C	250.00a	300.00a	56147.60
8	COMP_G.C	300.00a	325.00a	27477.20
9	COMP_H.C	325.00a	350.00a	26689.60
10	COMP_J.C	350.00a	375.00a	25443.60
11	COMP_K.C	375.00a	400.00a	23468.30
12	COMP_L.C	400.00a	450.00a	37784.60
13	COMP_M.C	450.00a	495.41a	22525.00
14	COMP_N.S	192.88a	201.00a	1944.21
15	COMP_P.S	201.00a	221.00a	5037.60
16	COMP_Q.S	221.00a	241.00a	5983.19
17	COMP_R.S	241.00a	261.00a	7045.27
18	COMP_S.S	261.00a	281.00a	7456.46
19	COMP_T.S	281.00a	301.00a	7369.39
20	COMP_U.S	301.00a	341.00a	14440.00
21	COMP_V.S	341.00a	361.00a	7023.16
22	COMP_W.S	361.00a	381.00a	6772.44
23	COMP_X.S	381.00a	396.98a	7880.93
24	COMP_N.P	192.88a	201.00a	1944.21
25	COMP_P.P	201.00a	221.00a	5037.60
26	COMP_Q.P	221.00a	241.00a	5983.19
27	COMP_R.P	241.00a	261.00a	7045.27
28	COMP_S.P	264.00a	281.00a	7456.46
29	COMP_T.P	281.00a	301.00a	7369.39
30	COMP_U.P	301.00a	341.00a	14440.00
31	COMP_V.P	341.00a	361.00a	7023.16
32	COMP_W.P	361.00a	381.00a	6772.44
33	COMP_X.P	381.00a	396.98a	7880.93

*The Suffixs C - Centerline
S - Starboard
P - Port

Table 3. List of Watertight Compartments.

The compartments inside the side hulls and the connecting box in between those hulls and the main hull, are considered to be completely watertight compartments. In regard to the center hull a longitudinal bulkhead provides separation between the connection boxes and the side compartments, providing the required watertight integrity for both the center hull and the side hulls. Figure 8, illustrates how the watertight division is made between the main hull and the side ones.

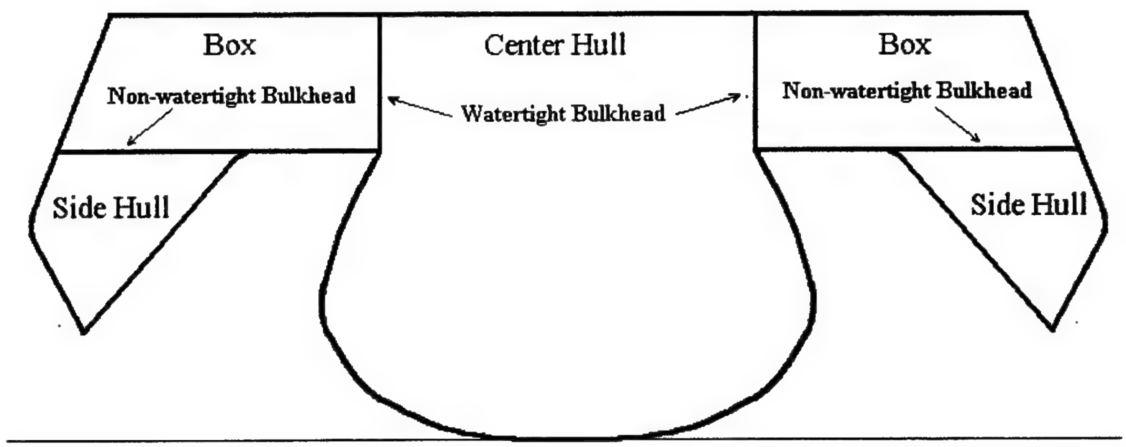


Figure 8. Watertight Division Between Center and Side Hulls.

The compartments in the side hulls have been designed to be used for liquid storage tanks and may also contain auxiliary machinery. The small separation between bulkheads allows for the accomplishment of this purpose. In the case of storage tanks, when flooding occurs after damage, the effects could be minimal because of the small difference in weight between the liquid originally inside the tank and the water.

For this thesis the worst initial conditions were assumed; that is a light ship without any liquid stored in tanks. This assumption was made for the purpose of obtaining the basic information concerned with the stability characteristics after damage

to this unconventionally designed hull. This is a very conservative assumption; if a side hull tank is holed and sea water replaces its contents, the contained liquid volume might actually decrease, resulting in an increase of buoyancy. As stated, for this study, all tanks were assumed to be initially empty. For future studies the results obtained with this thesis should be a departure point. Model building using the GHS program is a useful tool that can be used in future simulations.

E. CENTER OF GRAVITY AND INITIAL STABILITY CONDITION

The trimaran combatant is just a research project still in the process of development by the Navy. At this time there is not much information about trimaran characteristics, weights and locations onboard. The position of the center of gravity (KG) is one of the assumptions necessary to perform this phase of the project design. In order to define the location of the center of gravity of the ship the following procedure was performed:

1. Longitudinal and Transverse Center of Gravity

The Longitudinal Center of Gravity (LCG) was located along the X axes in the middle section, over the center line. It was moved along the center line of the ship until an even keel was obtained. The resulting values found were: LCG= 217.60 ft. after the origin point with the Transverse Center of Gravity (TCG) over the center line.

2. Vertical Center of Gravity

The Vertical Center of Gravity (VCG) was located using real data obtained from previous ship designs. For that purpose the data included in Table 4, was analyzed. Based on this analysis, the vertical center of gravity was assumed to be 55% of the hull depth above the baseline. This corresponds to KG= 21.65 ft.

Later in the calculation process it was possible to see that the approach made for calculating the VCG was good enough for this step of the design. When the Trimaran combatant project progresses further, and actual weight estimates would be available, the calculation must be refined.

SHIP	DRAFT (ft.)	KG (ft.)	% DEPTH
Frigate	30	18.53	0.62
DDG51	42	23.00	0.55
WMEC	31	17.00	0.55

Table 4. Data Used to Calculate VCG.

III. RESULTS AND DISCUSSION

A. GEOMETRICAL CHARACTERISTICS

The analysis of the stability of this type of ship is especially interesting because of its unusual shape. Special attention has been given by the design team in NAVSEA to reducing the drag force of the hull. This is a design with a long and narrow center hull, with the side hulls just touching the surface of the water, tumble-home center hull shape and the bow with a wavepiercer shape to reduce drag. The advantages and disadvantages of these characteristics are not the subject of this thesis, but this thesis addresses the damage stability response.

The ship's compartments are essentially tanks which are not normally used for tankage purposes. In order to run the damage stability simulation, both tanks and compartments were treated in the same way except that the permeability could be specifically assigned for each compartment. For the present study only watertight compartments are relevant.

The water level of a flooded compartment is considered to be the water level outside the ship after the equilibrium position has been reached. No liquid stored inside the tanks is considered in the damage stability analysis, just the response of the hull in a light ship condition with an initial draft of 15.43 ft.

B. SIMULATIONS

The nomenclature given to the ship's watertight compartments is show in Figure 9. The compartments in the port hull were not named because just the starboard side was analyzed in the present study. The results obtained are valid for both sides due to the vessel symmetry. Chapter II, Table 2, includes the characteristics of the watertight compartments.

Ten cases were analyzed in order to see the different kinds of responses under various conditions of flooding. An intact stable ship was included as the first case for the

purpose of creating a reference point for the other damage cases. They are grouped as follows:

- Center hull bow flooded.
- Center hull stern flooded.
- Side hull bow flooded.
- Side hull stern flooded.

For each case the metacentric height and the righting arm versus heel curve were obtained using the GHS program and they are included in this chapter. For a clearer understanding each of the 10 cases is presented as follows:

- Graphic of the flooded sections.
- Table of results obtained including the stability indicators.
- Plot of the righting arm versus heel angle curve, showing the metacentric height (GM).

A summary of results is shown in Table 15, where it is easy to compare and analyze the data obtained.

1. Case No. 1

Compartments affected: None.

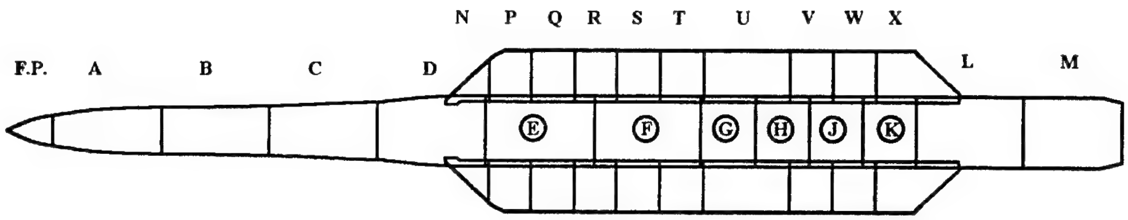


Figure 9. Case 1. Intact Stability

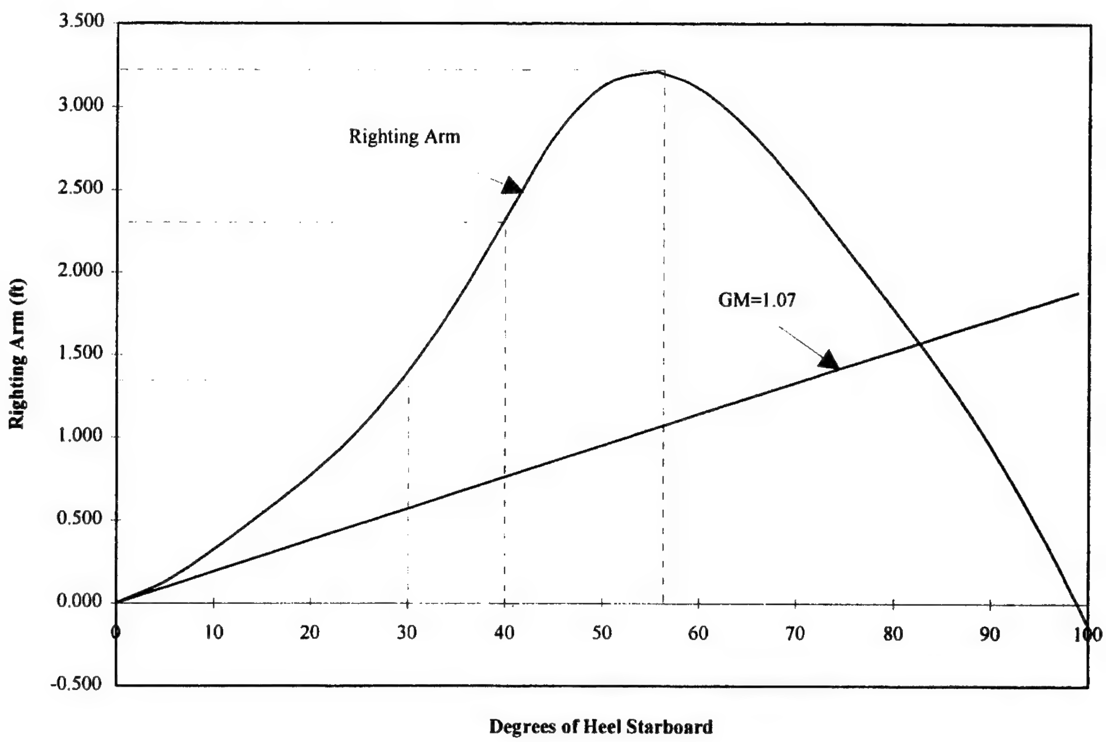


Figure 10. Intact Stability, Righting Arm and GM Curve.

CASE 1				
Origin	Degrees of		Righting Arm	
Depth ft.	Trim	Heel	Trim	Heel
15.425	0.00	0.00	0.03a	0.0000
15.411	0.03f	5.00s	0.01a	0.129s
15.365	0.12f	10.00s	0.01f	0.323s
15.277	0.24f	15.00s	0.05a	0.540s
15.165	0.38f	20.00s	0.00	0.770s
14.972	0.54f	25.00s	0.00	1.044s
14.682	0.71f	30.00s	0.00	1.393s
14.296	0.90f	35.00s	0.02f	1.819s
13.818	1.11f	40.00s	0.01f	2.319s
13.289	1.34f	45.00s	0.01f	2.819s
12.717	1.58f	50.00s	0.01a	3.125s
12.047	1.81f	55.00s	0.01a	3.207s
11.862	1.87f	56.25s	0.02a	3.198s
11.264	2.03f	60.00s	0.03a	3.107s
10.389	2.24f	65.00s	0.00	2.867s
9.399	2.42f	70.00s	0.00	2.537s
8.274	2.59f	75.00s	0.00	2.160s
7.011	2.73f	80.00s	0.03a	1.773s
5.648	2.85f	85.00s	0.03a	1.383s
4.304	2.97f	90.00s	0.04a	0.948s
3.041	3.10f	95.00s	0.03a	0.439s
2.125	3.21f	98.88s	0.02a	0.001s
1.874	3.25f	100.00s	0.00	-0.133s

Table 5. Case 1 Intact Stability, Results.

2. Case No. 2

Compartments affected

Forepeak.C
Comp_A.C;
Comp_ B.C.

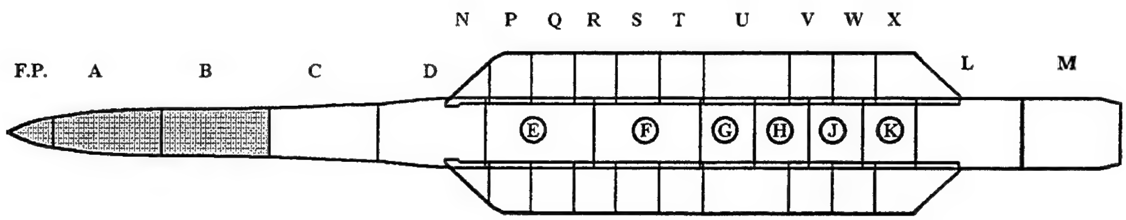


Figure 11. Compartment Flooded - Case 2

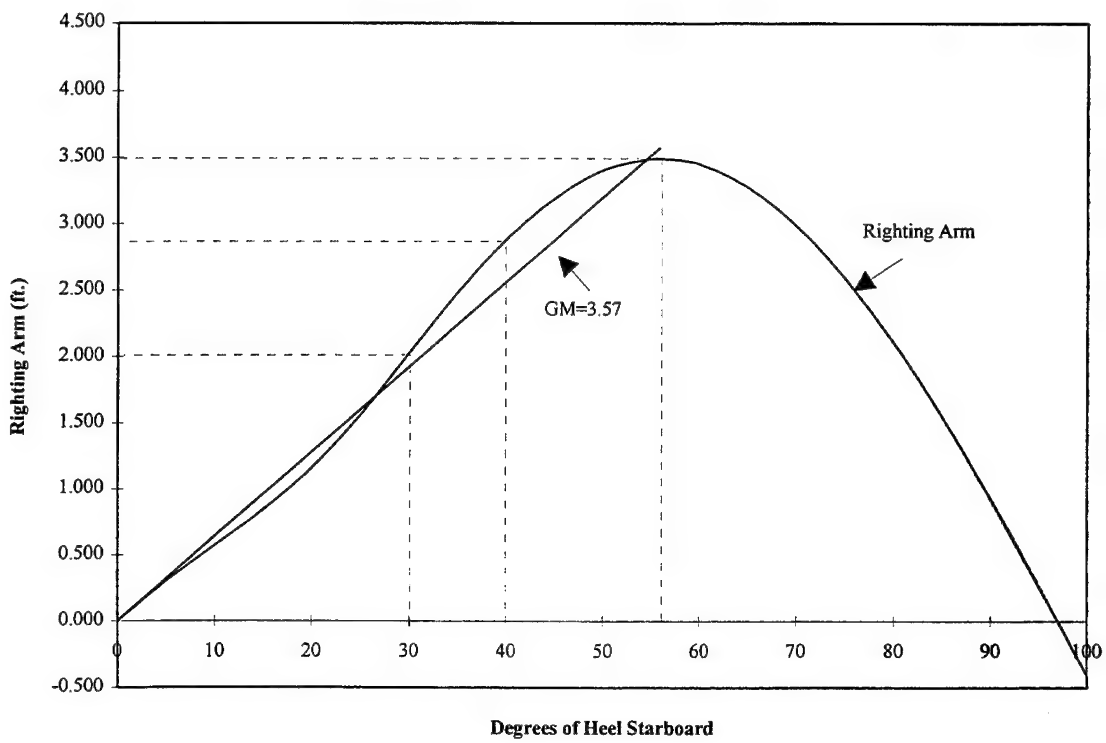


Figure 12. Case 2, Righting Arm and GM Curve.

CASE 2				
Origin	Degrees of		Righting Arm	
Depth ft.	Trim	Heel	Trim	Heel
41.324	4.94f	0.000	0.02f	0.000
41.217	4.95f	5.00s	0.000	0.300s
40.847	4.97f	10.00s	0.04f	0.570s
40.059	4.97f	15.00s	0.04a	0.839s
39.250	5.02f	20.00s	0.000	1.155s
38.366	5.08f	25.00s	0.01a	1.556s
37.468	5.18f	30.00s	0.01a	2.018s
36.575	5.32f	35.00s	0.01a	2.474s
35.741	5.49f	40.00s	0.01a	2.874s
34.945	5.70f	45.00s	0.01a	3.184s
34.153	5.92f	50.00s	0.04a	3.400s
33.442	6.19f	55.00s	0.000	3.488s
33.318	6.24f	55.90s	0.000	3.491s
32.732	6.47f	60.00s	0.04a	3.450s
32.105	6.77f	65.00s	0.01a	3.278s
31.483	7.08f	70.00s	0.000	2.989s
30.893	7.41f	75.00s	0.000	2.592s
30.310	7.73f	80.00s	0.02a	2.106s
29.669	8.03f	85.00s	0.04a	1.548s
29.005	8.32f	90.00s	0.02a	0.933s
28.276	8.58f	95.00s	0.02a	0.277s
27.941	8.68f	97.04s	0.01a	0.003s
27.456	8.81f	100.00s	0.000	-0.404s

Table 6. Case 2 Results.

3. Case No. 3

Compartments affected: Forepeak.C; Comp_ A.C; Comp_ B.C; Comp_ C.C.

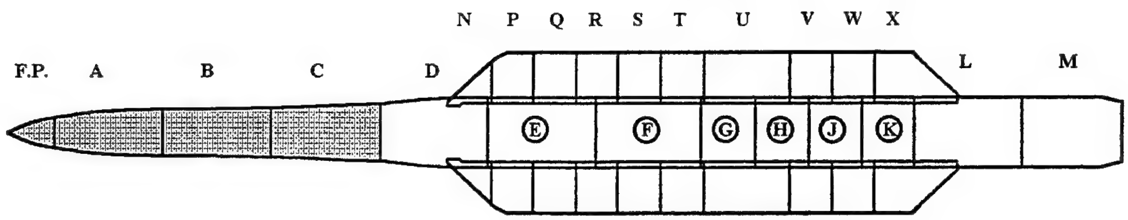


Figure 13. Compartment Flooded - Case 3.

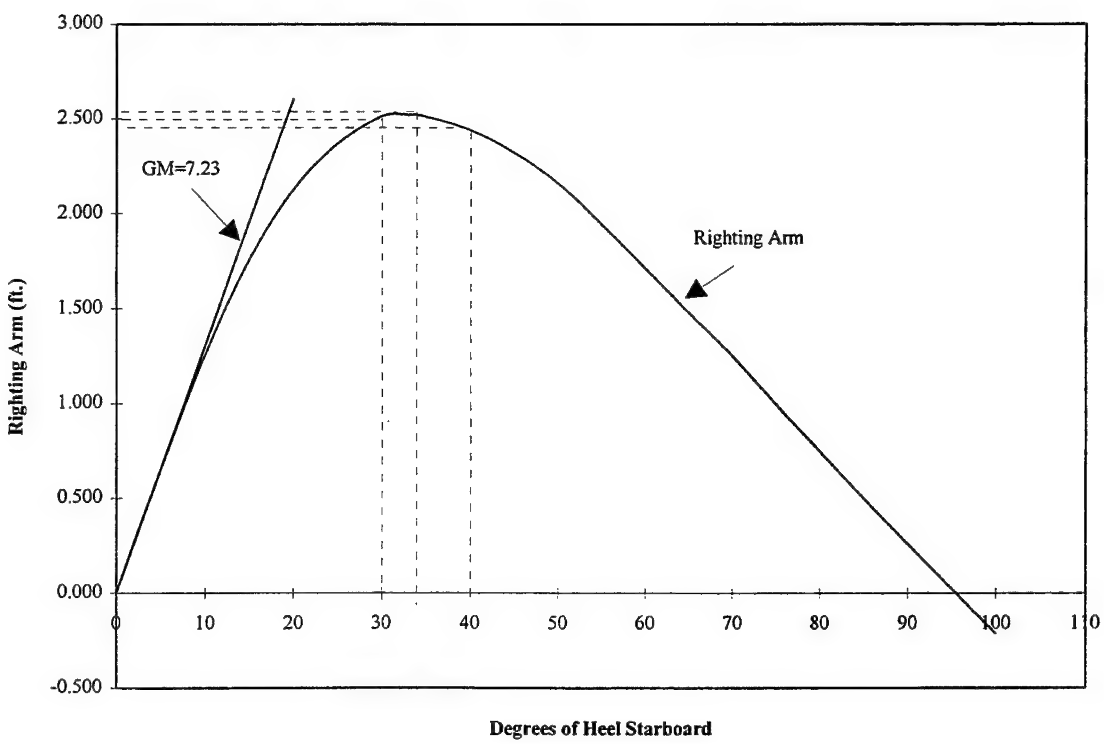


Figure 14. Case 3, Righting Arm and GM Curve.

CASE 3				
Origin	Degrees of		Righting Arm	
Depth ft.	Trim	Heel	Trim	Heel
102.305	18.04f	0.02s	0.01f	0.003s
103.106	18.25f	5.02s	0	0.654s
105.11	18.80f	10.02s	0.03f	1.259s
107.342	19.45f	15.02s	0.01a	1.756s
110.429	20.35f	20.02s	0.02a	2.127s
114.35	21.51f	25.02s	0	2.371s
118.17	22.69f	30.02s	0.02a	2.513s
120.665	23.46f	32.73s	0	2.524s
122.671	24.09f	35.02s	0	2.512s
127.029	25.49f	40.02s	0.01f	2.441s
131.067	26.85f	45.02s	0.01f	2.321s
134.793	28.17f	50.02s	0.01a	2.157s
138.761	29.59f	55.02s	0.02a	1.942s
142.172	30.89f	60.02s	0.02a	1.716s
145.127	32.08f	65.02s	0.02a	1.480s
147.142	33.05f	70.02s	0.04a	1.251s
149.438	34.11f	75.02s	0.02f	0.994s
149.847	34.68f	80.02s	0.01a	0.745s
149.773	35.12f	85.02s	0.01a	0.499s
149.321	35.44f	90.02s	0.01a	0.259s
147.707	35.44f	95.02s	0	0.023s
147.312	35.38f	95.51s	0.01a	0.000s
144.76	35.08f	100.02s	0.01f	-0.213s

Table 7. Case 3 Results.

4. Case No. 4

Compartments affected: Comp_ L.C
Comp_ M.C

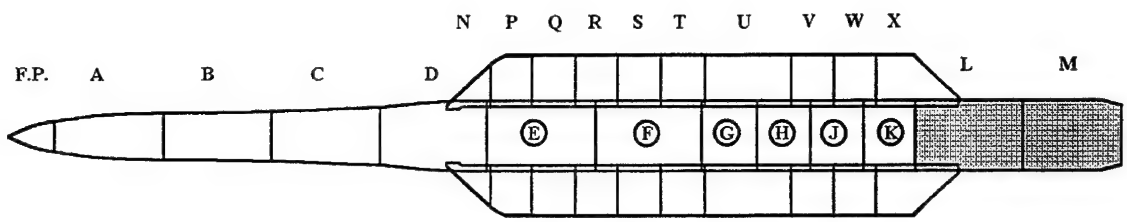


Figure 15. Compartment Flooded - Case 4.

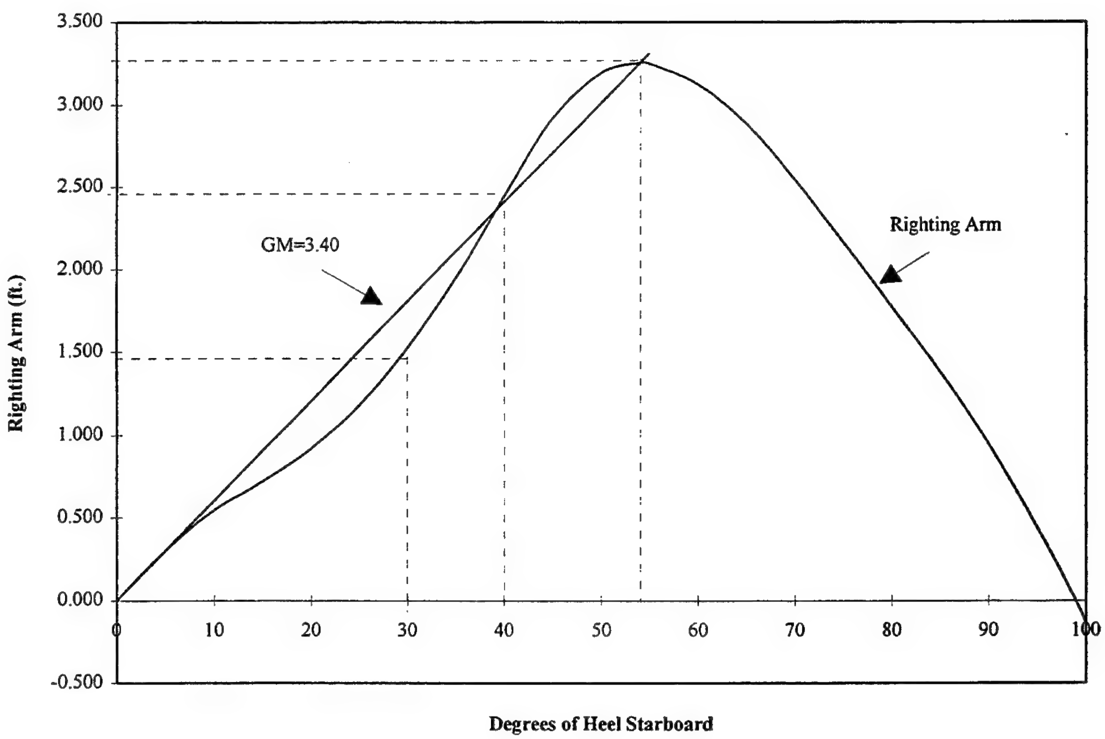


Figure 16. Case 4, Righting Arm and GM Curve.

CASE 4				
Origin Depth ft.	Degrees of		Righting Arm	
	Trim	Heel	Trim	Heel
14.047	0.46a	0	0.01f	0
14.108	0.40a	5.00s	0.01a	0.301s
14.255	0.25a	10.00s	0.04f	0.545s
14.298	0.09a	15.00s	0.04a	0.717s
14.295	0.09f	20.00s	0.05a	0.919s
14.219	0.29f	25.00s	0	1.179s
14.037	0.50f	30.00s	0	1.523s
13.757	0.72f	35.00s	0	1.945s
13.395	0.97f	40.00s	0	2.440s
12.98	1.24f	45.00s	0.02a	2.918s
12.499	1.51f	50.00s	0.03a	3.193s
12.019	1.72f	54.10s	0	3.254s
11.903	1.76f	55.00s	0	3.250s
11.177	2.00f	60.00s	0	3.132s
10.333	2.21f	65.00s	0.01a	2.882s
9.371	2.41f	70.00s	0.01a	2.544s
8.258	2.58f	75.00s	0.02a	2.164s
7.009	2.73f	80.00s	0.02a	1.774s
5.648	2.85f	85.00s	0.03a	1.383s
4.303	2.97f	90.00s	0.04a	0.948s
3.04	3.10f	95.00s	0.03a	0.439s
2.125	3.21f	98.88s	0.02a	0.001s
1.874	3.25f	100.00s	0	-0.133s

Table 8. Case 4 Results.

5. **Case No. 5**

Compartments affected: Comp_ K.C; Comp_ L.C; Comp_ M.C.

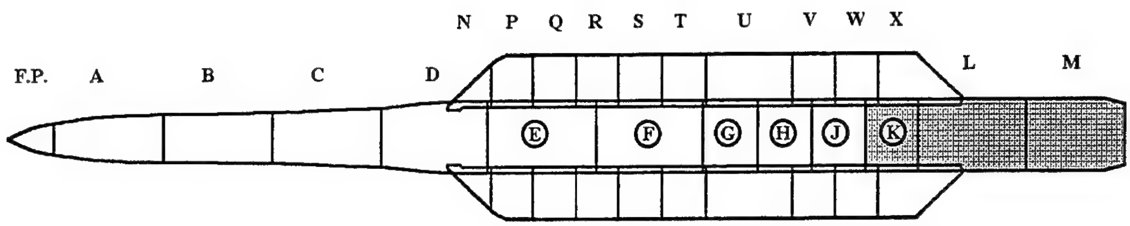


Figure 17. Compartment Flooded - Case 5.

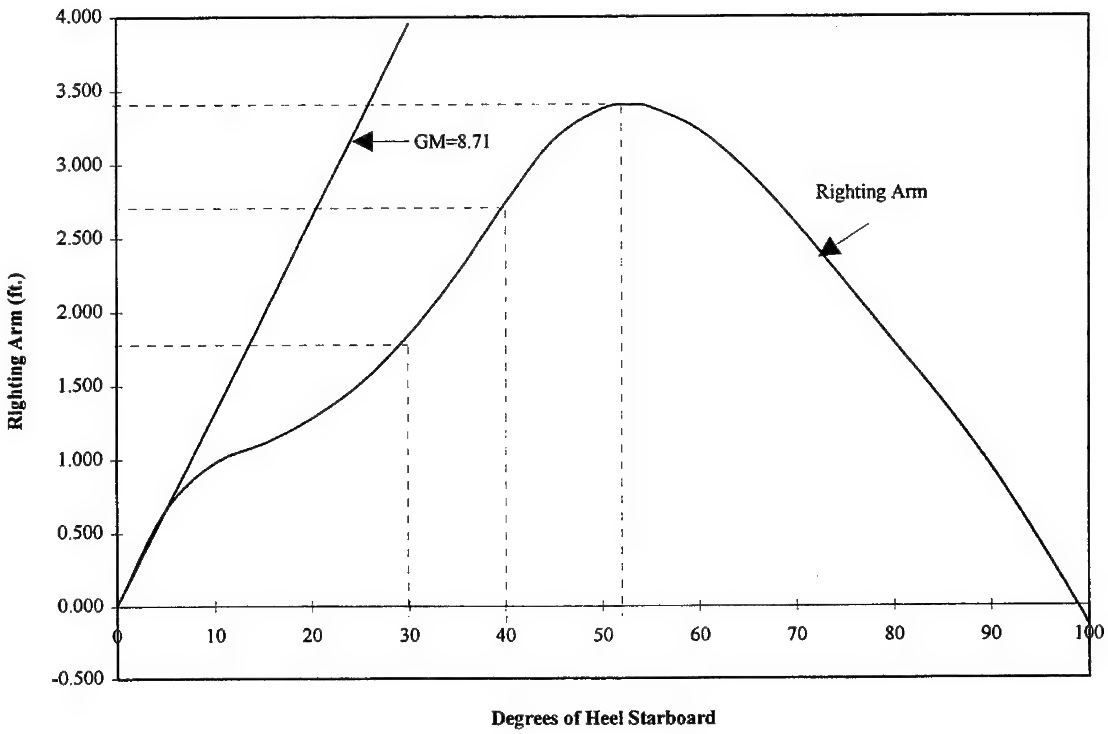


Figure 18. Case 5, Righting Arm and GM Curve.

CASE 5				
Origin	Degrees of		Righting Arm	
Depth ft.	Trim	Heel	Trim	Heel
12.477	1.02a	0	0	0
12.623	0.93a	5.00s	0.01a	0.659s
12.844	0.76a	10.00s	0	0.978s
13.031	0.54a	15.00s	0	1.111s
13.143	0.32a	20.00s	0.04a	1.279s
13.191	0.08a	25.00s	0	1.519s
13.133	0.17f	30.00s	0	1.848s
12.981	0.45f	35.00s	0	2.255s
12.749	0.74f	40.00s	0	2.732s
12.468	1.05f	45.00s	0.02a	3.162s
12.09	1.36f	50.00s	0.01a	3.374s
11.809	1.52f	52.91s	0.01f	3.402s
11.577	1.64f	55.00s	0	3.385s
10.926	1.90f	60.00s	0	3.232s
10.144	2.14f	65.00s	0.01f	2.952s
9.227	2.36f	70.00s	0.01a	2.594s
8.167	2.55f	75.00s	0	2.195s
6.953	2.71f	80.00s	0.02a	1.793s
5.621	2.84f	85.00s	0.02a	1.393s
4.296	2.97f	90.00s	0.03a	0.951s
3.04	3.10f	95.00s	0.03a	0.439s
2.127	3.21f	98.87s	0.02a	0.001s
1.872	3.25f	100.00s	0	-0.134s

Table 9. Case 5 Results.

6. **Case No. 6**

Compartments affected: Comp_ E.C
Comp_ F.C
Comp_ G.C

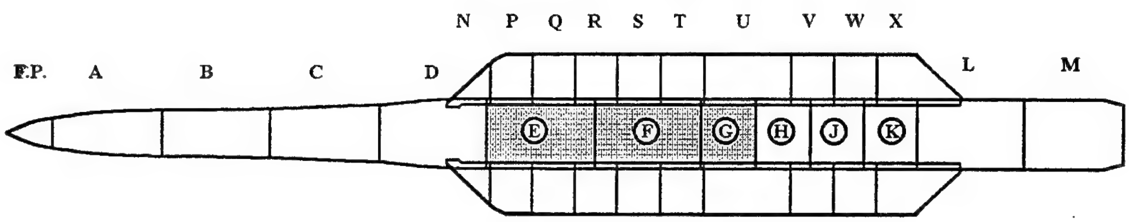


Figure 19. Compartment Flooded - Case 6

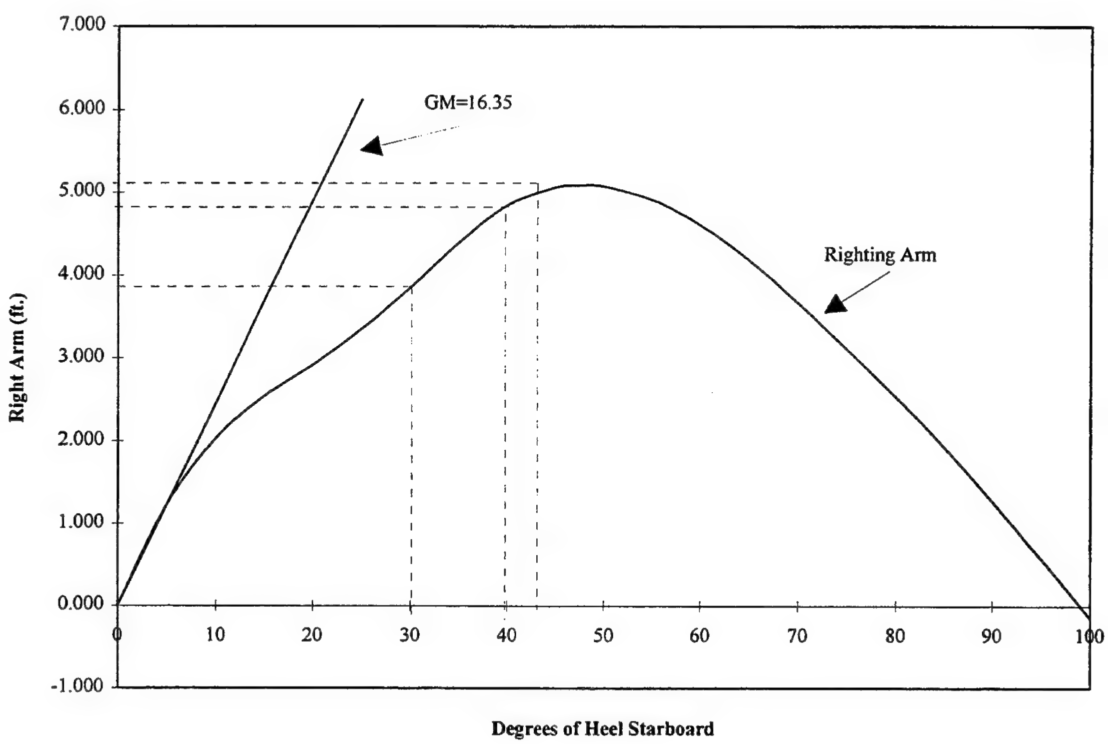


Figure 20. Case 6, Righting Arm and GM Curve.

CASE 6				
Origin Depth ft.	Degrees of		Righting Arm	
	Trim	Heel	Trim	Heel
21.887	0.27f	0	0.01a	0
21.820	0.29f	5.00s	0	1.225s
21.555	0.34f	10.00s	0.05f	2.030s
21.000	0.39f	15.00s	0.01a	2.534s
20.221	0.45f	20.00s	0.02a	2.912s
19.329	0.53f	25.00s	0.03a	3.348s
18.385	0.64f	30.00s	0.05a	3.849s
17.430	0.78f	35.00s	0.01a	4.385s
16.496	0.95f	40.00s	0	4.839s
15.596	1.14f	45.00s	0.01a	5.056s
15.094	1.24f	47.79s	0.01f	5.085s
14.685	1.32f	50.00s	0.02a	5.067s
13.744	1.51f	55.00s	0.01a	4.908s
12.752	1.69f	60.00s	0.01f	4.609s
11.686	1.85f	65.00s	0.03f	4.188s
10.519	1.99f	70.00s	0	3.671s
9.207	2.10f	75.00s	0.04a	3.111s
7.793	2.20f	80.00s	0.04a	2.535s
6.355	2.29f	85.00s	0.05a	1.931s
4.977	2.39f	90.00s	0	1.275s
3.653	2.49f	95.00s	0	0.579s
2.647	2.57f	98.99s	0.01a	0.002s
2.404	2.59f	100.00s	0	-0.148s

Table 10. Case 6 Results.

7. Case No. 7

Compartments affected:

Comp_ N.S   Comp_ P.S
Comp_ Q.S   Comp_ R.S
Comp_ S.S   Comp_ T.S

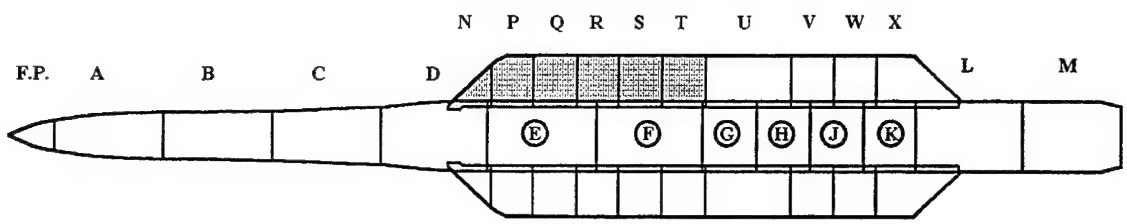


Figure 21. Compartment Flooded - Case 7.

CASE 7				
Origin Depth ft.	Degrees of		Righting Arm	
	Trim	Heel	Trim	Heel
-8.093	4.01f	166.46s	0	-0.026s
-8.099	4.01f	166.55s	0.02f	0.000s
-8.660	4.00f	171.46s	0	1.309s
-8.977	4.01f	176.46s	0	2.648s
-9.110	4.02f	180.00s	0	3.548s

Table 11. Case 7 Results.

8. **Case No. 8.**

Compartments affected:

Comp_ S.S	Comp_ T.S
Comp_ U.S	Comp_ V.S
Comp_ W.S	Comp_ X.S

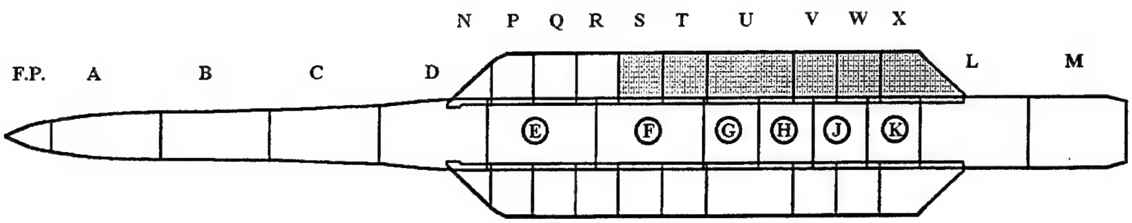


Figure 22. Compartment Flooded - Case 8.

CASE 8				
Origin Depth ft.	Degrees of		Righting Arm	
	Trim	Heel	Trim	Heel
-10.305	3.04f	157.67s	0.01a	-0.041s
-10.359	3.05f	158.12s	0.03a	0.000s
-10.794	3.16f	162.67s	0.03a	0.463s
-11.153	3.29f	167.67s	0.03a	1.074s
-11.334	3.43f	172.67s	0	1.770s
-11.305	3.57f	177.67s	0.05a	2.420s
-11.226	3.63f	180.00s	0.01a	2.703s

Table 12. Case 8 Results.

9. **Case No. 9**

Compartments affected: Comp_ H.C, Comp_ J.C, Comp_ K.C, Comp_ L.C, Comp_ V.S, Comp_ W.S, Comp_ X.S

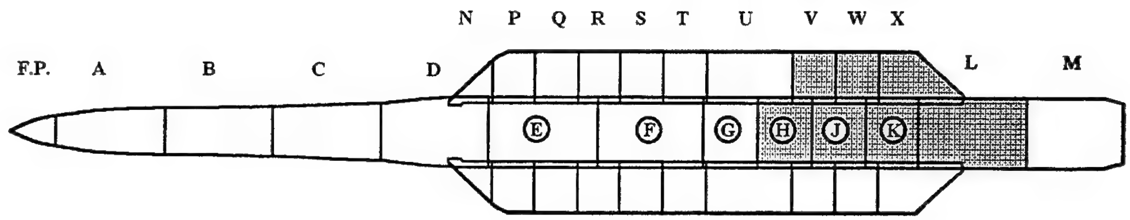


Figure 23. Compartment Flooded - Case 9.

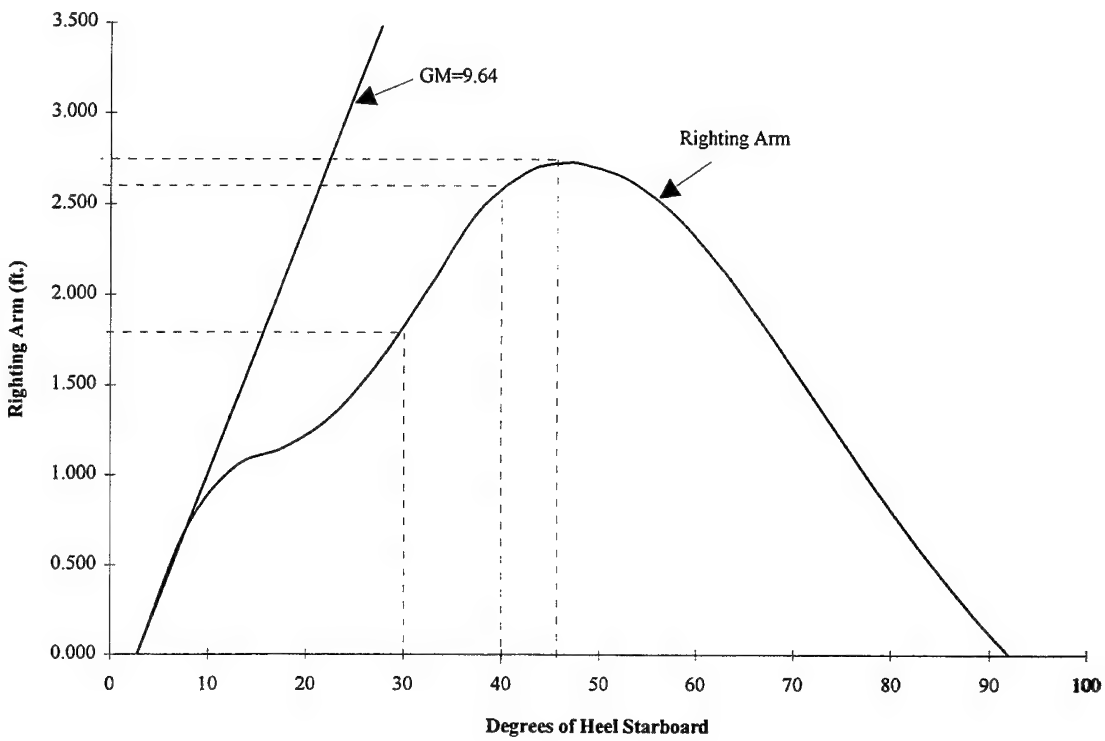


Figure 24. Case 9, Righting Arm and GM Curve.

CASE 9				
Origin	Degrees of		Righting Arm	
Depth ft.	Trim	Heel	Trim	Heel
11.773	1.59a	2.77s	0	0.002s
11.503	1.63a	7.77s	0.02a	0.698s
11.302	1.59a	12.77s	0.01f	1.044s
11.050	1.49a	17.77s	0.02f	1.152s
10.735	1.37a	22.77s	0.02a	1.332s
10.400	1.20a	27.77s	0.04a	1.648s
10.032	0.99a	32.77s	0	2.053s
9.605	0.76a	37.77s	0	2.466s
9.131	0.53a	42.77s	0	2.683s
8.741	0.36a	46.52s	0	2.727s
8.602	0.31a	47.77s	0.01a	2.725s
8.006	0.09a	52.77s	0.03a	2.640s
7.344	0.12f	57.77s	0	2.439s
6.574	0.32f	62.77s	0.01a	2.137s
5.693	0.50f	67.77s	0.02a	1.771s
4.697	0.67f	72.77s	0.03a	1.372s
3.585	0.83f	77.77s	0.03a	0.976s
2.371	0.96f	82.77s	0.01a	0.599s
1.052	1.08f	87.77s	0.01a	0.257s
-0.105	1.17f	91.92s	0	0.000s
-0.341	1.18f	92.77s	0.01a	-0.052s
-1.691	1.28f	97.77s	0.01a	-0.377s
-2.972	1.39f	102.77s	0.01a	-0.722s

Table 13. Case 9 Results.

10. Case No. 10

Compartments affected:		
	Comp_ D.C	Comp_ E.C
	Comp_ F.C	Comp_ N.S
	Comp_ P.S	Comp_ Q.S
	Comp_ R.S	

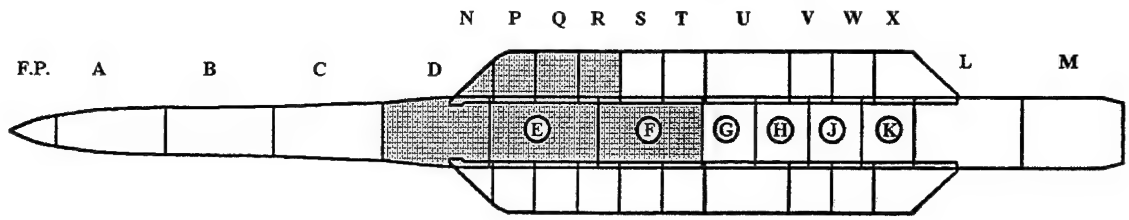


Figure 25. Compartment Flooded - Case 10.

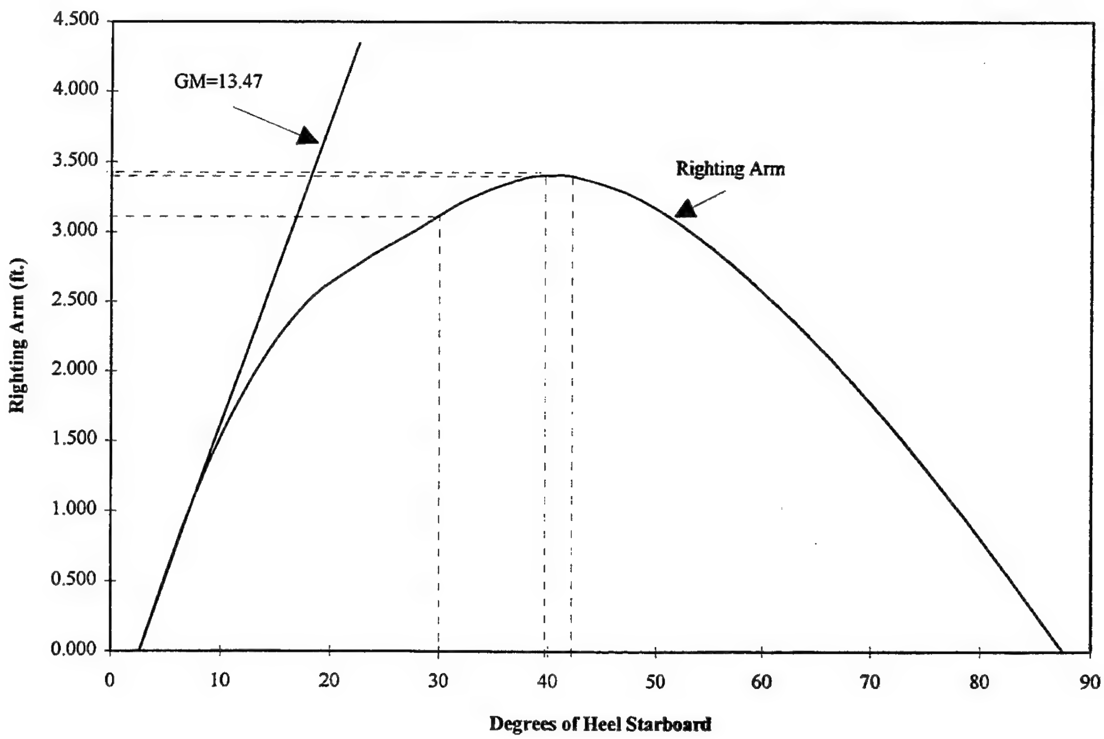


Figure 26. Case 10, Righting Arm and GM Curve.

CASE 10				
Origin	Degrees of		Righting Arm	
Depth ft.	Trim	Heel	Trim	Heel
34.885	2.31f	2.59s	0	0.006s
35.119	2.39f	7.59s	0	1.092s
34.996	2.47f	12.59s	0.04f	1.915s
34.282	2.50f	17.59s	0	2.472s
33.088	2.51f	22.59s	0.02f	2.772s
31.634	2.51f	27.59s	0.03a	3.002s
30.132	2.53f	32.59s	0	3.232s
28.605	2.57f	37.59s	0	3.382s
27.736	2.60f	40.45s	0.01a	3.408s
27.054	2.61f	42.59s	0.02f	3.393s
25.460	2.65f	47.59s	0.01f	3.268s
23.796	2.68f	52.59s	0	3.040s
22.081	2.71f	57.59s	0.01a	2.739s
20.353	2.74f	62.59s	0.01a	2.382s
18.686	2.78f	67.59s	0.03a	1.980s
17.111	2.84f	72.59s	0.01a	1.535s
15.660	2.92f	77.59s	0.02a	1.052s
14.291	3.01f	82.59s	0.04a	0.536s
13.052	3.12f	87.52s	0.01a	0.000s
13.028	3.12f	87.59s	0.03a	-0.007s
11.888	3.24f	92.59s	0.01a	-0.575s
10.869	3.38f	97.59s	0.01a	-1.161s
9.948	3.53f	102.59s	0	-1.763s

Table 14. Case 10 Results.

C. RESULTS

1. Analysis of Results

In the concepts of naval architects the righting arm magnitude and the range of heel angle for which there is a positive righting arm are the best indicators of stability. For naval vessels the rule for damage survival, as was mentioned before in Chapter I, is to maintain the vessel after damage at static heel that does not exceed 15 degrees. This is the maximum angle at which the onboard machinery can operate. The maximum of 20 degrees is permitted, because it is assumed that a ship with such a list can be safely towed back to port for repair. In the final and maximum flooded condition, the margin line in calm sea, must not be submerged at any place along the ship's length and the residual metacentric height must be positive. [Ref. 6]

In Table 15 the results are tabulated. Two cases are considered critical, Cases 7 and 8. In these cases the ship capsized because the metacentric height was negative and the righting arm works in the opposite direction. These results are not surprising because the ship condition after damage is catastrophic. The conditions are as follows:

- Six continuous compartments inside a side hull are flooded.
- A large unsymmetrical moment force.
- The opposite side hull is completely empty.
- The center hull completely empty.
- The position of the side hull is relatively high with respect to the center hull. As the side hull floods the center of gravity is moved upward in an unsymmetrical way.

This situation could be minimized using ballast tanks in the opposite side hull when it is not full of liquids like fuel or fresh water. Additionally, it was found that when the center hull compartments were flooded the ship increased its draft, after a time the

cross structure (boxes) between the center and sides hulls, will reach the water and reduce the heel angle due to an increase in buoyancy force.

2. Analysis of the Maximum Righting Arm

The maximum righting arm (RA), for the intact stability case is 3.21 ft. as is shown in Figure 10. After the normal condition of load, low tanks with fluids, RA would be expected to increase. For damage Cases 7 and 8, RA is negative. For the remaining damage cases the RA increases because of the presence of low loads when the compartments in the center hull are flooded. The exception is Case 3 where because of a radical trim angle to the bow the effect on the side hulls is lessened, and the RA is reduced. This behavior is an indicator that the calculations are reasonable. Figure 27 is a summary.

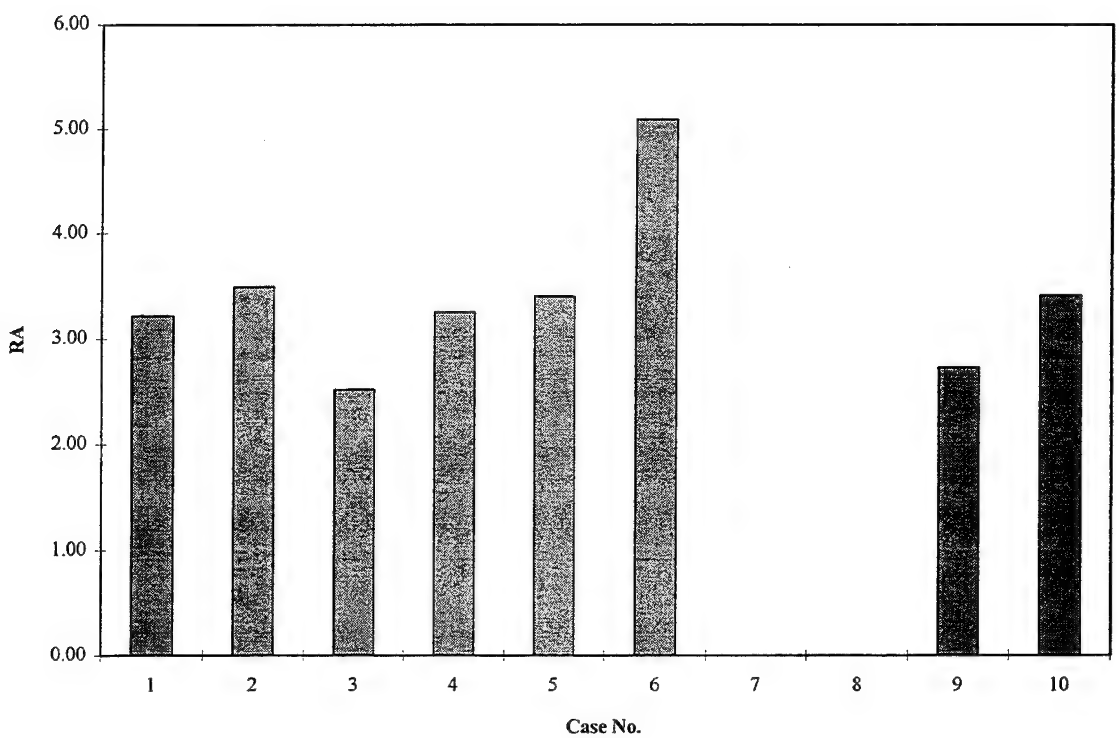


Figure 27. Righting Arm Case 1 Through 10.

3. Analysis of the Range of Stability

Range of stability is a very good indicator because it is the range where the RA is positive on the side where the ship has a list angle. The higher the list angle is after damage the smaller the range of the stability. In the results with the exception of Cases 7 and 8, the range of stability is between 84 and 99 degrees, which is far greater than for an equivalent monohull. This is an advantage expected for the trimaran hull's shape, and is a result of the additional moment of inertia given by the side hulls and the moment produced by the additional buoyancy force given by the side hull when it is submerged. In Cases 7 and 8, this advantage becomes a disadvantage with the opposite effects of the huge moment caused by a weight that is nonsymmetrically located in the side hull, with a righting arm at a relatively large distance from the center line of the ship, where flooding is present. Figure 28 shows the range of stability for each case, (with cases 7 and 8 being unstable).

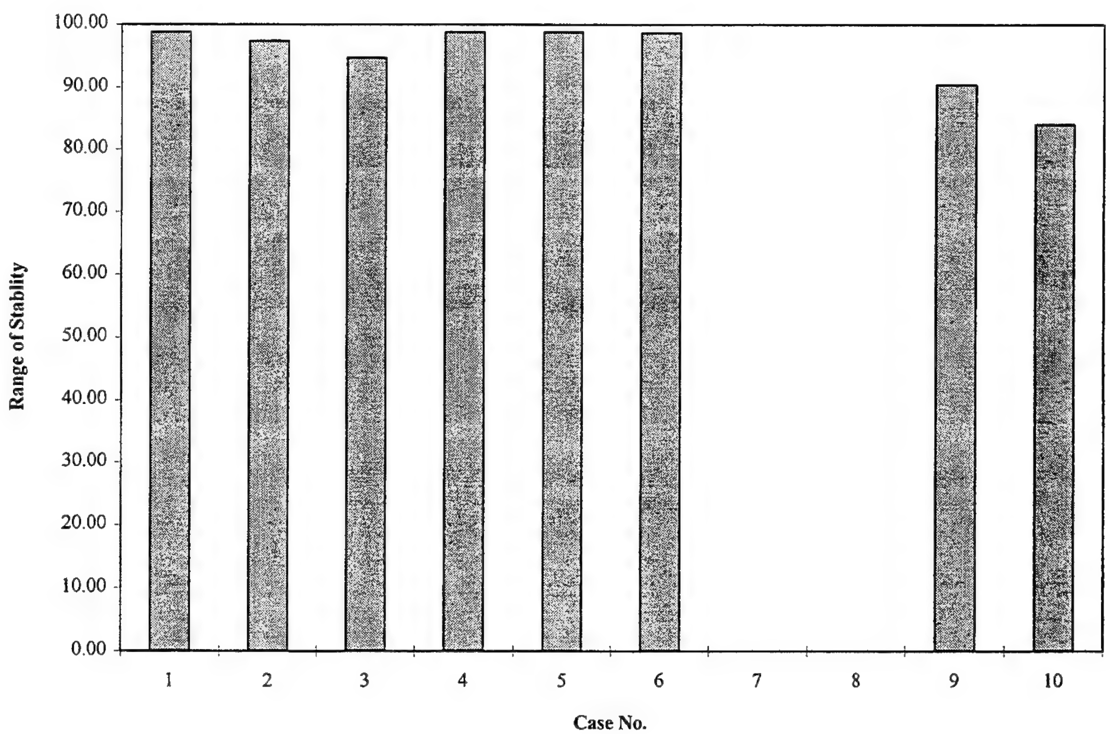


Figure 28. Range of Stability Case 1 Through 10.

4. Heel Angle Analysis

With the exception of Cases 7 and 8, the transverse heel is not a problem. This aspect of the trimaran hull is exceptionally good. The maximum list angle after damage in Case 9 was 2.77 degrees. These small angles of list are the result of the fact that the widely separated side hulls develop large restoring moments. The increased buoyancy of the low side hull as well as the decreased buoyancy (increased weight) of the high side hull both operate on a long lever arms and resist the inclination strongly. In the same way there would be an expected additional buoyancy force that would decrease the list angle when the side boxes between the center hull and side hulls are submerged due to a large heel angle.

The situation with the longitudinal trim angle is different. There is a critical situation present when the trim angle is 18.03 degrees as in the Case 3. This does not mean that the vessel will sink but in this situation the machinery is not expected to remain in service, and the vessel must be towed back to port. This critical case is caused by four continuous flooded compartments including the fore peak. This is more than the standard two flooded compartments requirement of the Navy's stability criteria. In the same way the geometry of the ship, with the side hulls located mainly in the center and posterior part of the center hull and the reduction in waterplane area due to the bow shape, results in a greater increase of buoyancy force in the stern than in the bow when the trimaran's hull is submerged. With the ship's tanks loaded with liquids there is an expected reduction of the trim angle due to the displacement of the center of gravity towards the stern. Table 15 shows the trimaran damage stability results and a summary of this study.

Total Weight:	4600 LT.	LCG:	217.60 a. ft.	TCG:	0.00 ft.	VCG:	21.65 ft.
	Length:	516.41 ft.	Breadth:	73.78 ft.	Draft:	15.43 ft.	

CASENo.	COMPARTMENTS FLOODED	HEEL	TRIM	RANGE	MAX. RA (ft)
1	NONE	0.00	0.00	98.82	3.21s
2	FOREPEAK.C COMP_A.C COMP_B.C	0.00	4.93f	97.37	3.49s
3	FOREPEAK.C COMP_A.C COMP_B.C COMP_C.C	0.04p	18.03f	94.80	2.52s
4	COMP_L.C COMP_M.C	0.00	0.46a	98.83	3.25s
5	COMP_K.C COMP_L.C COMP_M.C	0.00	1.02a	98.83	3.40
6	COMP_E.C COMP_F.C COMP_G.C	0.00	0.27f	98.67	5.09s
7	COMP_N.S COMP_P.S COMP_Q.S COMP_R.S COMP_S.S COMP_T.S	166.60s*	4.01f*		*
8	COMP_S.S COMP_T.S COMP_U.S COMP_V.S COMP_W.S COMP_X.S	158.44s*	3.06f*	*	*
9	COMP_V.S COMP_W.S COMP_X.S COMP_H.C COMP_J.C COMP_K.C COMP_L.C	2.77s	1.59a	90.43	2.73s
10	COMP_N.S COMP_P.S COMP_Q.S COMP_R.C COMP_D.C COMP_E.C COMP_F.C	2.58s	2.31f	84.08	3.41s

*Ship Capsizes

Table 15. Summary of Results.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The trimaran combatant is a project in process of development and with great potential to become reality. The analysis of the stability of this kind of hull is a more difficult task than for a monohull because of the unusual geometric configuration and fact that the side hulls increase the transverse stability of the ship, but also in some conditions may affect stability adversely, as in Cases 7 and 8 of this study. In these cases the flooding of some compartments caused the ship to capsize because of the huge moment caused for the weight and the distance at which that moment was applied.

The results obtained in this study show good transverse stability characteristics in the majority of the cases analyzed after damage to the "4600 tons Trimaran Frigate." A minimum heel angle after damage was observed in all cases and a very large righting arm, with the exception of Case 7 and 8 where only one side hull was affected by flooding and the ship was in light condition.

When the damaged area is in compartments located in the bow, a relatively large trim angle results because of the aft-of-midships location of the side hulls. Essentially, there is less buoyant volume forward than aft so that forward flooding increases trim far more than does after flooding.

The most important stability indicators were analyzed in light ship conditions. Unsurprisingly, the worst conditions were found to correspond to the cases of a side hull being damaged with the opposite hull and the center hull compartments completely empty. This is not a normal condition, but the necessity to locate the tanks in the side hulls is imperative in order to obtain the stability benefits of the trimaran multihull. The bottom line is that if the side tanks were filled with liquid, the change of stability after damage would not be affected significantly. Additionally, the geometrical location of the side compartments is higher with respect to the rest of the vessel; this means the main

hull must have ballast tanks to ensure that the position of the center of gravity is low enough. This again is to obtain all the benefits of stability aspects of the trimaran multihull design.

The application of the trimaran configuration to large vessels is a completely new concept. For combatant ships it is very unusual and novel. The information available is minimal and the institutions that are doing research on this configuration of ship are holding information closely. The Naval Postgraduate School has begun research in this area and there are good possibilities for obtaining interesting results.

B. RECOMMENDATIONS

This thesis is just a beginning; the trimaran project is still in the early stages of development and there are many possibilities for research in this area. Some of the topics that the author suggests for future research are:

- Analysis the intact static and dynamic stability with the ship in load condition.
- Analysis of the static and dynamic damage stability with the ship in load condition.
- Comparative study of the trimaran combatant ship in its present form, tumble-home hull and wavepiercer bow, versus a conventional hull and bow shape. This study could be performed in two parts: stability considerations and resistance considerations.
- In the cases of analysis of a fully loaded ship, there is an interesting condition for analysis. When the side tanks are loaded with ballast, fuel or fresh water, and the side hull suffers damage and is open to the sea, the effect is going to be a loss of weight instead of a gain. This is because the side hull is not deep in the water and its load of ballast, fuel or fresh water will be lost to the sea. The heel of the vessel is going to be in the opposite direction normally expected. When the ship is damaged on the starboard side hull, the list angle is going to be to port.

The Naval Postgraduate School is continuing to work in this area in coordination with NAVSEA, this project has great possibilities of becoming a reality and the NPS

should be a part of its development. My suggestion is that the people enrolled in the Total System Ship Engineering Program (TSSE), consider working in this area and direct their thesis and TSSE final projects to topics related to the trimaran combatant.

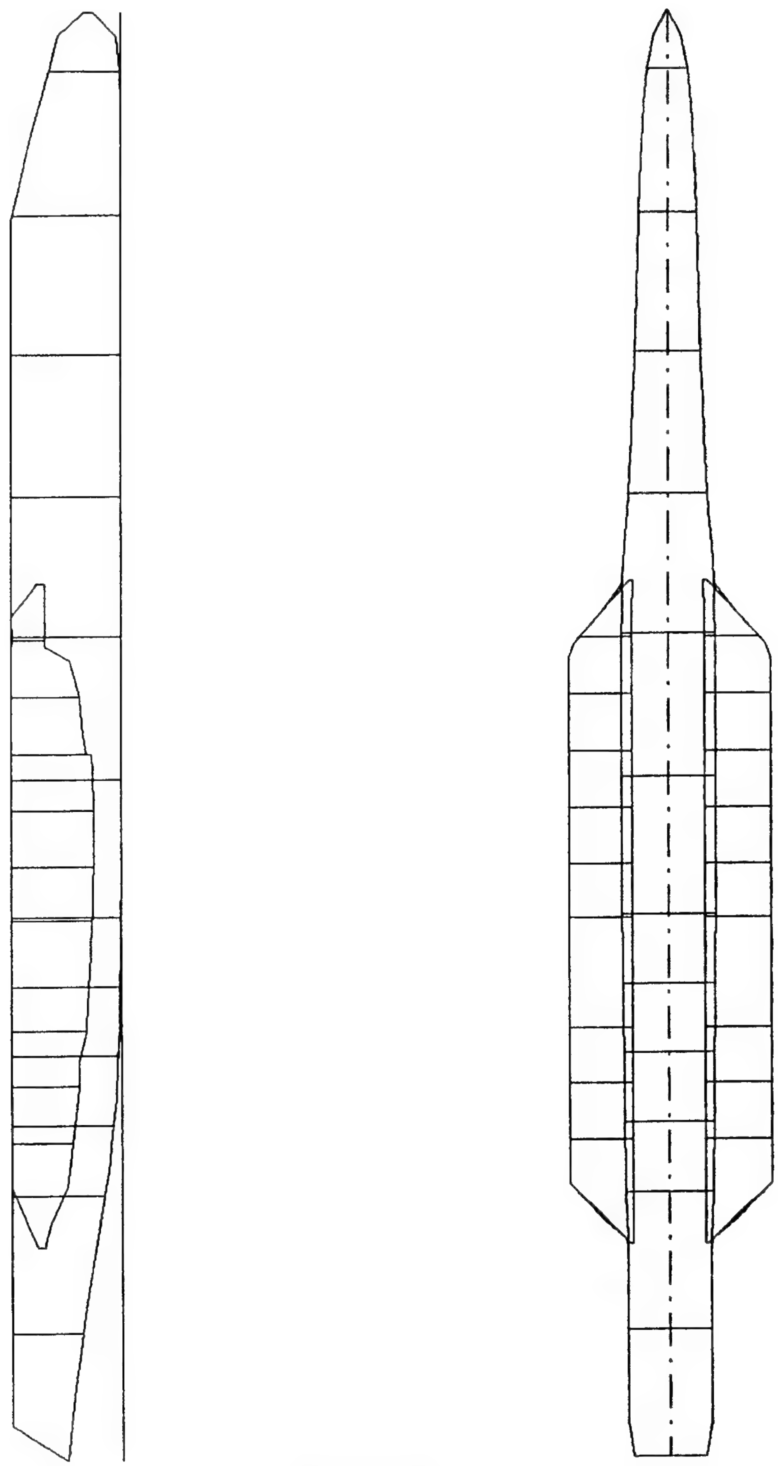
Finally, I want to recommend the creation of a parallel academic program in the TSSE area for international students, excluding of course the areas requiring clearance, but allowing the opportunity to learn in this interesting and important field. The courses included in this program and the focus given in the preparation of the students are, in my opinion, the most important tools for a Naval Officer in naval/mechanical engineering.

APPENDIX

This appendix includes the offsets points for the "4600 Trimaran Combatant Ship" and the offsets corresponding to the internal watertight divisions. The points for the main hull were converted from a Ship Hull Characteristics Program (SHCP) file, obtained from NAVSEA's original model. The conversion made by computer was subject to error and had to be checked point by point. The offsets points for the side hulls were not understood by the conversion program and those points had to be added manually. The internal compartments were built using the "tank maker program", but again the unusual shape of this ship made it a difficult task to build the internal configuration. For the purpose of solving these difficulties it was necessary to divide the center hull into two parts. The first step was to construct compartments until reaching the lower part of the connection boxes between the main and side hulls, then eliminating the parts corresponding to the side hulls and calculate the points necessary to delimit those compartments. The same task was performed for the side tanks, this time eliminating the parts corresponding to the center hull and rebuilding the separator watertight bulkheads. Finally, the result was a file "trimaran.gf" that is an accurate geometrical model of the trimaran combatant including its internal watertight division.

This appendix includes a section corresponding to the output of the program "General Hydrostatics" using the command "display print". This output is easier to understand than the file "trimaran.gf". The trimaran.gf file is organized part by part and section by section, and the graphic presentation of the parts is slow. In contrast, the output of "General Hydrostatics" program is clear and makes the "4600 Tons Trimaran Combatant Ship" design easier to understand.

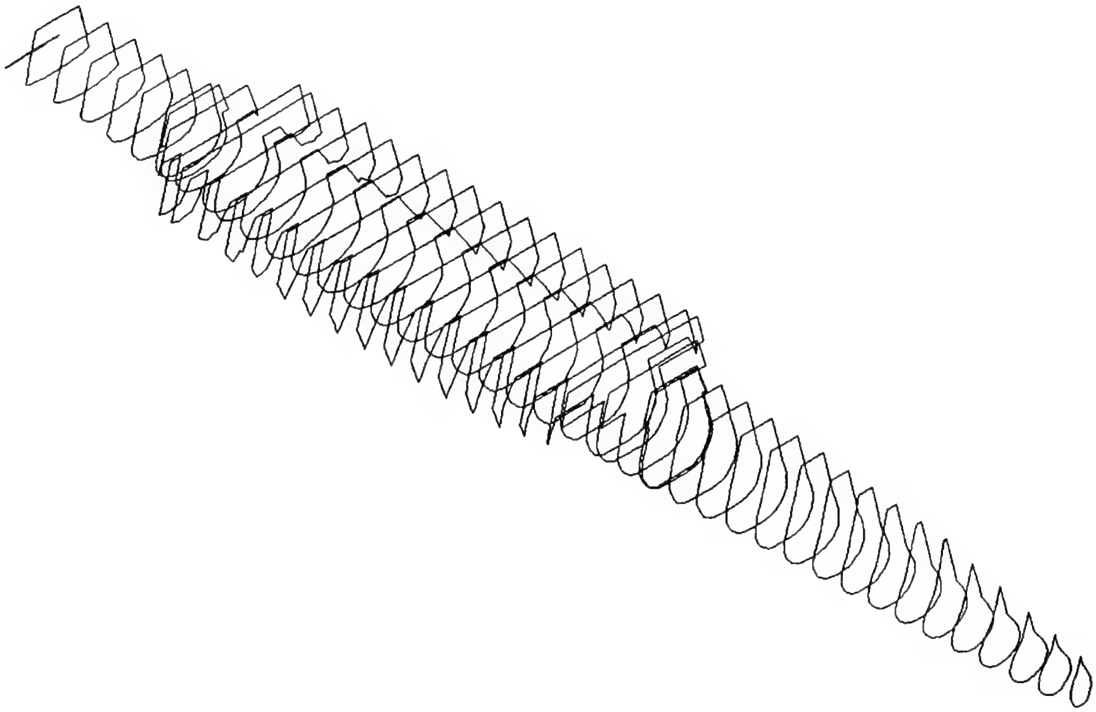
For future research the model is available and could be used to modify or incorporate compartments or tanks. The most laborious part with respect to the model construction has been done.



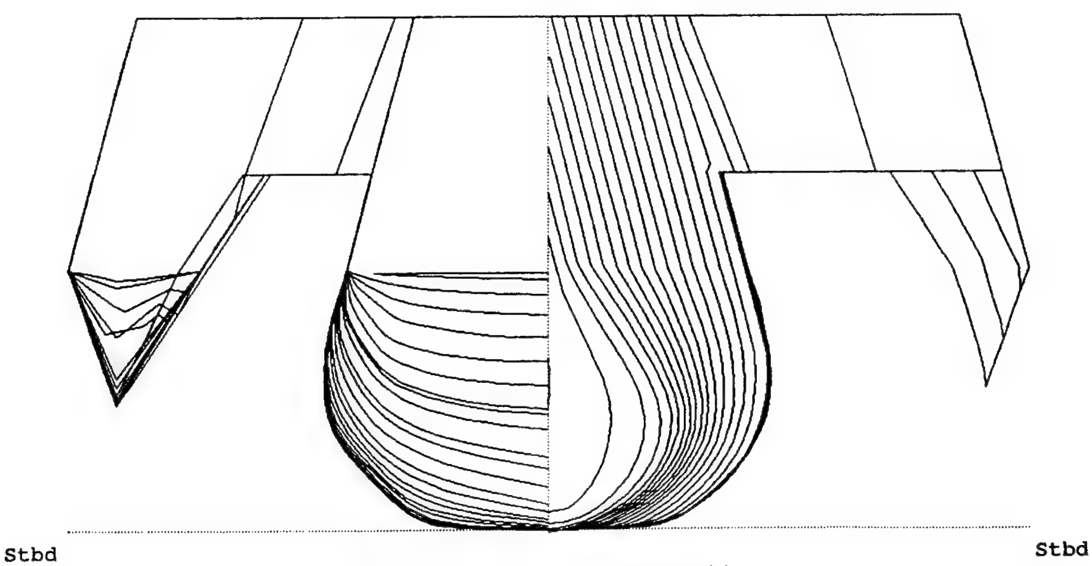
Scale = 1:700

Part Name	Class	Description	Location	Volume
HULL	HULL		21.00f to 495.41a	
FOREPEAK.C	TANK		21.00f to 0.00	2652.27
COMP_A.C	TANK		0.00 to 50.00a	16332.2
COMP_B.C	TANK		50.00a to 100.00a	27358.5
COMP_C.C	TANK		100.00a to 150.00a	39145.2
COMP_N.S	TANK		181.35a to 201.00a	1944.21
COMP_N.P	TANK		181.35a to 201.00a	1944.21
COMP_P.S	TANK		201.00a to 221.00a	5037.60
COMP_P.P	TANK		201.00a to 221.00a	5037.60
COMP_Q.S	TANK		221.00a to 241.00a	5983.19
COMP_Q.P	TANK		221.00a to 241.00a	5983.19
COMP_R.S	TANK		241.00a to 261.00a	7045.27
COMP_R.P	TANK		241.00a to 261.00a	7045.27
COMP_S.S	TANK		261.00a to 281.00a	7456.46
COMP_S.P	TANK		261.00a to 281.00a	7456.46
COMP_T.S	TANK		281.00a to 301.00a	7369.39
COMP_T.P	TANK		281.00a to 301.00a	7369.39
COMP_U.S	TANK		301.00a to 341.00a	14440.0
COMP_U.P	TANK		301.00a to 341.00a	14440.0
COMP_V.S	TANK		341.00a to 361.00a	7023.16
COMP_V.P	TANK		341.00a to 361.00a	7023.16
COMP_W.S	TANK		361.00a to 381.00a	6772.44
COMP_W.P	TANK		361.00a to 381.00a	6772.44
COMP_X.S	TANK		381.00a to 419.00a	7880.93
COMP_X.P	TANK		381.00a to 419.00a	7880.93
COMP_D.C	TANK		150.00a to 200.00a	52086.5
COMP_E.C	TANK		200.00a to 250.00a	56536.7
COMP_F.C	TANK		250.00a to 300.00a	56147.6
COMP_G.C	TANK		300.00a to 325.00a	27477.2
COMP_H.C	TANK		325.00a to 350.00a	26689.6
COMP_J.C	TANK		350.00a to 375.00a	25443.6
COMP_K.C	TANK		375.00a to 400.00a	23468.3
COMP_L.C	TANK		400.00a to 450.00a	37784.6
COMP_M.C	TANK		450.00a to 495.41a	22525.0

Locations in Feet fwd/aft of the origin. Volumes in cubic Feet.



HULL Isometric Projection



HULL Body Plan (1 component)

Component 1: HULL.C

Offsets in Feet. Read across --->

Section at	21.00 fwd													
trans:	0.00	0.12	0.10	0.00										
vert:	9.76	10.90	12.05	13.20										
Section at	12.39 fwd													
trans:	0.00	1.55	2.44	3.44	4.23	4.78	5.01	4.88	4.39	3.53	2.31	1.18	0.40	0.00
vert:	1.36	1.65	2.28	3.41	4.85	6.49	8.19	9.87	11.62	13.57	15.92	18.27	20.88	22.36
Section at	0.00													
trans:	0.00	1.67	1.70	2.68	4.01	5.19	6.21	7.01	7.51	7.60	7.24	6.90	5.84	3.82
vert:	0.51	0.64	0.71	1.01	1.74	2.71	3.94	5.39	6.97	8.61	10.32	11.20	13.19	16.34
trans:	1.91	1.38	0.36	0.00										
vert:	19.49	20.66	24.49	25.82										
Section at	12.39 aft													
trans:	0.00	1.23	2.80	3.96	4.86	6.16	7.26	8.12	8.68	8.85	8.57	7.81	7.27	5.71
vert:	0.03	0.24	0.65	1.13	1.62	2.64	3.84	5.23	6.75	8.34	10.00	11.84	12.82	15.26
trans:	4.07	3.17	2.36	1.42	0.55	0.00								
vert:	17.69	19.09	20.48	24.00	27.23	29.30								
Section at	26.07 aft													
trans:	0.00	1.39	2.53	3.42	4.51	6.11	7.33	8.37	9.14	9.58	9.62	9.24	8.41	6.06
vert:	-0.18	0.09	0.37	0.64	1.12	2.07	3.12	4.39	5.83	7.35	8.90	10.56	12.44	16.37
trans:	3.44	2.48	1.58	0.00										
vert:	20.31	23.88	27.23	33.13										
Section at	39.11 aft													
trans:	0.00	0.23	1.54	2.70	4.33	5.90	6.47	7.71	8.86	9.53	9.94	10.12	10.13	9.87
vert:	-0.12	-0.12	0.08	0.32	0.89	1.71	2.06	3.10	4.46	5.64	6.87	7.59	9.12	10.35
trans:	9.60	8.64	6.82	4.45	3.47	2.56	0.15	0.00						
vert:	11.22	13.34	16.49	20.19	23.81	27.23	36.25	36.25						
Section at	52.15 aft													
trans:	0.00	0.46	1.68	2.88	4.16	5.69	6.83	8.10	9.34	9.91	10.31	10.65	10.63	10.50
vert:	-0.07	-0.05	0.06	0.27	0.66	1.36	2.05	3.07	4.52	5.46	6.40	7.84	9.35	10.13
trans:	9.95	8.87	7.58	5.46	4.47	3.54	3.43	0.29	0.00					
vert:	11.88	14.25	16.61	20.08	23.74	27.23	27.63	39.37	39.37					
Section at	65.18 aft													
trans:	0.00	1.36	2.49	3.60	4.77	6.17	7.16	8.42	9.65	10.23	10.66	11.04	11.08	10.98
vert:	-0.04	0.01	0.14	0.37	0.78	1.47	2.06	3.07	4.49	5.41	6.33	7.74	9.22	9.98
trans:	10.54	9.63	8.49	6.45	5.46	4.52	4.41	1.27	0.00					
vert:	11.69	14.03	16.37	20.02	23.71	27.23	27.63	39.37	39.37					
Section at	78.22 aft													
trans:	0.00	2.25	3.72	4.89	6.15	7.48	8.74	9.63	10.30	11.02	11.43	11.53	11.46	11.14
vert:	-0.01	0.06	0.28	0.67	1.27	2.07	3.07	3.99	4.92	6.27	7.65	9.10	9.84	11.49
trans:	10.39	9.39	8.46	7.44	5.50	3.38	2.24	0.00						
vert:	13.81	16.13	18.05	19.97	27.23	35.14	39.37	39.37						
Section at	91.26 aft													
trans:	0.00	2.62	4.80	6.01	7.36	7.90	9.13	10.46	11.23	11.74	11.90	11.95	11.72	11.58
vert:	-0.00	0.06	0.47	0.97	1.73	2.08	3.08	4.62	5.89	7.25	7.94	9.79	11.37	12.11
trans:	11.00	10.20	9.39	8.42	6.79	6.47	4.37	3.22	0.00					
vert:	14.02	16.07	17.92	19.96	26.04	27.23	35.11	39.37	39.37					

Section at 104.30 aft

trans:	0.00	2.99	4.70	5.86	7.23	8.31	9.52	10.62	11.44	12.05	12.36	12.43	12.29	12.02
vert:	0.00	0.06	0.27	0.67	1.39	2.10	3.10	4.31	5.52	6.85	8.22	9.73	11.25	12.74
trans:	11.62	11.01	10.32	9.40	8.09	7.45	5.35	4.20	0.00					
vert:	14.23	16.01	17.79	19.95	24.84	27.23	35.08	39.37	39.37					

Section at 117.33 aft

trans:	0.00	3.38	5.14	6.21	7.62	8.84	10.01	11.04	11.86	12.49	12.87	12.98	12.92	12.69
vert:	0.00	0.05	0.22	0.56	1.28	2.11	3.12	4.25	5.43	6.75	8.27	9.67	11.19	12.81
trans:	12.38	11.87	11.27	10.38	9.14	8.43	6.34	5.18	0.00					
vert:	14.20	15.90	17.63	19.95	24.60	27.23	35.04	39.37	39.37					

Section at 130.37 aft

trans:	0.00	3.78	5.11	5.85	7.11	8.28	9.46	10.58	11.62	12.41	13.04	13.43	13.60	13.61
vert:	0.00	0.05	0.15	0.25	0.65	1.28	2.12	3.13	4.31	5.50	6.81	8.21	9.62	11.18
trans:	13.49	13.22	12.77	12.23	11.36	9.41	7.32	6.16	0.00					
vert:	12.63	14.07	15.78	17.49	19.94	27.23	35.01	39.37	39.37					

Section at 143.40 aft

trans:	0.00	4.15	5.52	6.30	7.63	8.84	10.12	11.20	12.21	12.99	13.63	14.06	14.29	14.36
vert:	0.00	0.05	0.15	0.22	0.59	1.21	2.13	3.14	4.32	5.50	6.81	8.23	9.67	11.24
trans:	14.28	14.05	13.64	13.16	12.34	10.39	8.28	7.13	0.00					
vert:	12.67	14.09	15.75	17.46	19.94	27.23	35.00	39.37	39.37					

Section at 156.44 aft

trans:	0.00	4.48	6.97	8.42	9.65	10.81	11.88	12.87	13.65	14.30	14.77	15.04	15.16	15.11
vert:	0.00	0.04	0.22	0.61	1.26	2.13	3.15	4.33	5.51	6.83	8.27	9.72	11.30	12.71
trans:	14.91	14.22	13.32	11.37	9.29	8.11	0.00							
vert:	14.13	17.04	19.94	27.23	34.99	39.37	39.37							

Section at 168.90 aft

trans:	0.00	4.72	4.75	7.37	8.94	10.25	11.47	12.57	13.57	14.37	15.04	15.55	15.86	16.00
vert:	0.00	0.03	0.03	0.19	0.58	1.24	2.13	3.17	4.35	5.54	6.88	8.37	9.87	11.73
trans:	15.87	15.53	14.26	13.09	12.29	12.57	10.34	9.48	9.04	0.00				
vert:	13.47	15.21	19.95	24.28	27.23	27.86	34.96	37.73	39.37	39.37				

Section at 181.35 aft

trans:	0.00	4.89	7.68	9.38	10.81	12.13	13.30	14.35	15.16	15.86	16.41	16.77	16.92	16.79
vert:	0.00	0.02	0.16	0.53	1.21	2.12	3.19	4.39	5.59	6.95	8.51	10.07	11.71	13.46
trans:	16.43	15.19	14.02	13.21	14.38	11.47	10.45	9.98	0.00					
vert:	15.20	19.96	24.29	27.23	27.23	34.93	37.61	39.37	39.37					

Section at 182.52 aft

trans:	0.00	4.90	7.70	8.69	10.12	10.85	12.19	13.37	14.39	15.24	15.94	16.50	16.86	17.01
vert:	0.00	0.02	0.16	0.32	0.82	1.20	2.12	3.19	4.35	5.59	6.96	8.53	10.10	11.74
trans:	16.86	16.50	15.27	14.89	13.25	15.55	12.63	10.96	0.00					
vert:	13.51	15.28	19.96	21.39	27.23	27.23	34.95	39.37	39.37					

Section at 192.88 aft

trans:	0.00	4.90	7.71	8.70	10.13	10.85	12.19	13.38	14.44	15.32	16.05	16.62	16.96	17.08
vert:	0.00	0.02	0.16	0.32	0.83	1.21	2.14	3.23	4.40	5.66	7.04	8.60	10.16	11.80
trans:	16.76	16.14	15.34	13.35	24.38	25.23	22.70	21.34	21.31	0.00				
vert:	14.54	17.24	19.98	27.23	27.23	27.23	35.12	39.29	39.37	39.37				

Section at 203.24 aft

trans:	0.00	4.91	7.71	8.71	10.13	10.86	12.19	13.40	14.48	15.41	16.17	16.74	17.07	17.16
vert:	0.00	0.02	0.16	0.32	0.83	1.23	2.17	3.28	4.46	5.73	7.12	8.67	10.23	11.85
trans:	16.86	16.28	15.41	13.45	33.21	34.92	32.77	31.71	31.66	0.00				
vert:	14.57	17.28	20.00	27.23	27.23	27.23	35.29	39.22	39.37	39.37				

Section at 208.59 aft

trans:	0.00	4.91	7.71	8.70	10.12	10.85	12.17	13.38	14.47	15.41	16.18	16.76	17.07	17.16
vert:	0.00	0.02	0.16	0.33	0.84	1.24	2.19	3.30	4.49	5.77	7.16	8.70	10.24	11.85
trans:	17.00	15.41	13.46	32.73	33.41	34.08	34.76	35.43	36.10	36.24	36.89	36.56	36.23	35.91
vert:	13.16	20.00	27.23	27.23	25.79	24.34	22.90	21.46	20.01	18.16	20.01	21.22	22.42	23.62
trans:	35.58	35.25	34.92	32.77	31.67	0.00								
vert:	24.83	26.03	27.23	35.32	39.37	39.37								

Section at 221.63 aft

trans:	0.00	4.91	7.72	8.71	10.10	10.82	12.12	13.32	14.43	15.42	16.22	16.78	17.08	17.15
vert:	0.00	0.02	0.17	0.35	0.87	1.27	2.24	3.36	4.56	5.85	7.23	8.73	10.28	11.87
trans:	16.97	16.75	15.42	13.64	13.47	29.51	30.45	31.06	32.00	33.28	34.25	34.69	34.95	35.41
vert:	13.58	14.64	20.00	26.59	27.23	27.23	25.61	24.70	23.08	20.73	17.48	15.94	14.54	15.83
trans:	36.25	36.89	36.48	35.91	35.50	34.92	32.76	31.67	0.00					
vert:	18.20	20.01	21.52	23.62	25.13	27.23	35.39	39.37	39.37					

Section at 234.67 aft

trans:	0.00	4.91	7.72	8.71	10.09	10.79	12.06	13.26	14.40	15.43	16.25	16.80	17.08	17.14
vert:	0.00	0.03	0.18	0.36	0.89	1.30	2.28	3.42	4.64	5.93	7.31	8.77	10.32	11.88
trans:	16.95	16.49	15.42	13.82	13.48	26.30	27.50	28.71	29.92	31.13	32.26	33.14	33.52	33.65
vert:	14.01	16.13	20.00	25.95	27.23	27.23	25.43	23.62	21.82	20.01	16.80	13.72	11.87	10.92
trans:	34.09	34.57	35.10	35.66	36.26	36.89	36.40	35.91	35.42	34.92	32.75	31.67	0.00	
vert:	12.16	13.51	14.98	16.56	18.24	20.01	21.82	23.62	25.43	27.23	35.45	39.37	39.37	

Section at 247.71 aft

trans:	0.00	4.96	7.80	8.88	10.28	10.92	12.16	13.33	14.51	15.55	16.38	16.89	17.13	17.16
vert:	-0.00	0.03	0.24	0.42	1.00	1.42	2.45	3.61	4.85	6.12	7.50	8.95	10.48	12.01
trans:	16.96	16.50	15.42	13.61	13.48	23.51	24.72	26.00	27.15	28.49	29.88	31.24	32.73	33.39
vert:	14.11	16.20	20.00	26.75	27.23	27.23	25.48	23.62	21.96	20.01	17.24	14.42	11.56	10.19
trans:	33.87	34.39	34.96	35.56	36.25	36.89	36.40	35.91	35.42	34.92	32.75	31.67	0.00	
vert:	11.53	12.99	14.58	16.29	18.24	20.01	21.82	23.62	25.43	27.23	35.47	39.37	39.37	

Section at 260.74 aft

trans:	0.00	2.84	4.93	6.75	8.78	10.14	10.80	12.00	13.16	14.39	15.45	16.33	16.87	17.13
vert:	0.01	0.04	0.07	0.16	0.47	1.03	1.45	2.43	3.58	4.85	6.12	7.50	8.93	10.46
trans:	17.17	16.98	16.53	15.42	13.48	21.84	24.38	26.91	30.10	31.87	33.24	34.14	35.13	35.67
vert:	11.99	14.10	16.20	20.00	27.23	27.23	23.62	20.01	14.85	12.01	9.79	12.30	15.08	16.60
trans:	36.25	36.89	35.91	35.42	34.92	32.75	31.67	0.00						
vert:	18.24	20.01	23.62	25.43	27.23	35.47	39.37	39.37						

Section at 273.77 aft

trans:	0.00	2.74	4.81	6.47	8.40	9.44	10.92	11.48	12.75	13.71	15.04	15.83	16.56	16.99
vert:	0.04	0.09	0.15	0.23	0.52	0.88	1.73	2.16	3.34	4.32	5.80	6.88	8.22	9.66
trans:	17.16	17.14	16.92	16.54	15.42	13.48	21.28	26.38	29.73	31.67	33.19	34.09	35.67	36.25
vert:	11.12	12.56	14.52	16.27	20.00	27.23	27.23	20.01	15.01	12.06	9.71	12.20	16.63	18.25
trans:	36.89	36.40	35.91	35.42	34.92	32.75	31.67	0.00						
vert:	20.01	21.82	23.62	25.43	27.23	35.46	39.37	39.37						

Section at 286.81 aft

trans:	0.00	2.59	4.60	6.01	7.74	8.88	10.32	10.88	12.11	13.13	14.35	15.43	16.34	16.89
vert:	0.08	0.17	0.26	0.35	0.57	0.83	1.47	1.85	2.89	3.93	5.20	6.47	7.84	9.26
trans:	17.15	17.19	17.00	16.54	15.42	13.48	21.84	26.90	30.13	31.88	33.24	34.14	35.67	36.26
vert:	10.77	12.27	14.31	16.35	20.01	27.23	27.23	20.01	14.89	12.11	9.96	12.43	16.66	18.27
trans:	36.89	36.40	35.91	35.42	34.92	32.76	31.67	0.00						
vert:	20.01	21.82	23.62	25.43	27.23	35.43	39.37	39.37						

Section at 299.85 aft

trans:	0.00	4.78	7.31	8.92	10.00	10.94	12.11	13.16	14.32	15.40	16.28	16.82	17.09	17.14
vert:	0.18	0.51	0.81	1.19	1.66	2.23	3.21	4.27	5.49	6.76	8.12	9.53	11.02	12.50
trans:	17.01	16.90	16.37	15.42	13.48	21.84	26.90	30.66	33.24	33.91	34.38	35.40	36.89	35.42
vert:	14.16	14.79	17.00	20.01	27.23	27.23	20.01	14.25	10.24	12.05	13.27	16.05	20.01	25.43
trans:	34.92	32.77	31.67	0.00										
vert:	27.23	35.40	39.37	39.37										

Section at 312.89 aft

trans:	0.00	4.97	6.87	8.96	10.37	11.00	12.12	13.19	14.30	15.36	16.21	16.75	17.02	17.09
vert:	0.28	0.76	1.04	1.55	2.20	2.60	3.53	4.60	5.78	7.05	8.40	9.80	11.27	12.74
trans:	17.03	16.81	16.19	15.41	13.48	21.84	26.90	31.18	33.24	33.68	34.14	34.63	35.14	36.89
vert:	14.01	15.28	17.64	20.01	27.23	27.23	20.01	13.61	10.52	11.66	12.86	14.12	15.45	20.01
trans:	36.40	35.91	35.42	34.92	32.77	31.67	0.00							
vert:	21.82	23.62	25.43	27.23	35.38	39.37	39.37							

Section at 325.92 aft

trans:	0.00	2.62	4.93	4.97	6.85	8.02	9.77	11.11	12.20	13.25	14.32	15.29	16.10	16.62
vert:	0.53	0.86	1.17	1.18	1.52	1.82	2.45	3.20	4.08	5.12	6.28	7.49	8.82	10.20
trans:	16.90	16.99	16.83	16.42	15.41	13.48	21.84	24.34	26.90	29.89	31.54	33.24	34.89	35.51
vert:	11.62	13.07	14.96	16.78	20.01	27.23	27.23	23.67	20.01	15.87	13.59	11.17	15.17	16.67
trans:	36.17	36.89	36.45	36.10	35.71	35.37	34.92	32.78	31.67	0.00				
vert:	18.27	20.01	21.64	22.90	24.34	25.61	27.23	35.37	39.37	39.37				

Section at 338.96 aft

trans:	0.00	2.62	4.89	6.82	8.03	9.78	11.22	12.28	13.31	14.35	15.23	15.98	16.49	16.78
vert:	0.77	1.18	1.58	1.99	2.32	2.98	3.81	4.63	5.63	6.79	7.94	9.23	10.60	11.98
trans:	16.89	16.77	16.39	15.41	13.48	21.84	24.37	26.90	30.14	31.89	33.24	34.89	35.51	36.17
vert:	13.39	15.15	16.91	20.01	27.23	27.23	23.62	20.01	15.83	13.58	11.83	15.53	16.92	18.40
trans:	36.89	36.50	36.10	35.71	35.32	34.92	32.78	31.67	0.00					
vert:	20.01	21.46	22.90	24.34	25.79	27.23	35.35	39.37	39.37					

Section at 352.00 aft

trans:	0.00	2.86	6.29	8.01	10.56	11.82	12.89	13.89	14.78	15.52	16.09	16.46	16.67	16.68
vert:	1.37	1.89	2.62	3.10	4.22	5.05	5.96	7.00	8.11	9.29	10.56	11.87	13.20	14.71
trans:	16.65	16.30	15.41	13.48	21.84	23.95	24.66	26.34	26.90	29.35	30.04	31.19	34.07	34.40
vert:	15.48	17.12	20.01	27.23	27.23	24.23	23.20	20.81	20.01	16.26	16.71	15.80	15.24	15.70
trans:	35.05	36.13	36.89	36.53	36.17	36.01	35.65	35.29	34.92	34.92	32.77	31.67	0.00	
vert:	16.88	18.65	20.01	21.34	22.66	23.26	24.59	25.91	27.23	27.23	35.38	39.37	39.37	

Section at 365.04 aft

trans:	0.00	3.10	5.77	8.00	9.89	11.35	12.46	13.43	14.33	15.06	15.68	16.15	16.44	16.58
vert:	1.97	2.61	3.24	3.88	4.64	5.46	6.29	7.22	8.28	9.34	10.51	11.76	13.01	14.27
trans:	16.53	16.22	15.41	13.48	21.84	23.53	24.15	24.95	25.78	26.10	26.90	28.55	29.94	31.15
vert:	15.80	17.33	20.02	27.23	27.23	24.83	23.94	22.79	21.62	21.15	20.01	16.69	17.59	16.63
trans:	32.24	33.24	33.91	34.60	36.09	36.89	36.56	36.24	35.91	35.58	35.26	34.93	34.92	32.76
vert:	15.76	14.96	15.88	16.84	18.90	20.01	21.22	22.42	23.62	24.83	26.03	27.23	27.23	35.40
trans:	31.67	0.00												
vert:	39.37	39.37												

Section at 378.08 aft

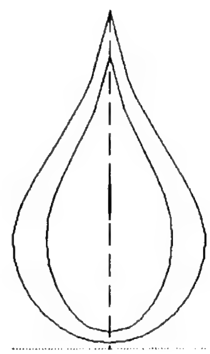
trans:	0.00	2.92	5.79	8.02	9.95	11.42	12.54	13.47	14.28	14.89	15.50	15.93	16.21	16.36
vert:	3.35	3.91	4.56	5.18	5.95	6.77	7.61	8.51	9.51	10.45	11.56	12.67	13.78	14.88
trans:	16.33	16.08	15.41	13.48	21.84	23.41	23.81	24.49	25.20	25.47	26.18	27.73	29.11	30.36
vert:	16.25	17.62	20.02	27.23	27.23	25.00	24.43	23.45	22.45	22.05	21.04	18.35	18.64	18.02
trans:	31.49	32.53	33.34	34.17	35.94	36.89	36.56	36.24	35.91	35.58	35.26	34.94	34.92	32.76
vert:	17.46	16.95	17.33	17.86	19.26	20.01	21.22	22.42	23.62	24.83	26.03	27.23	27.23	35.39
trans:	31.67	0.00												
vert:	39.37	39.37												

Section at	391.11 aft													
trans:	0.00	2.74	4.93	6.84	8.04	9.16	10.02	11.48	12.61	13.50	14.24	15.32	15.71	15.99
vert:	4.74	5.22	5.66	6.12	6.48	6.88	7.26	8.08	8.93	9.81	10.74	12.61	13.57	14.54
trans:	16.15	16.14	15.94	15.41	13.48	21.84	22.57	23.29	25.45	26.18	26.90	29.01	31.12	33.23
vert:	15.50	16.70	17.90	20.02	27.23	27.23	26.20	25.17	22.08	21.04	20.01	19.52	19.08	18.69
trans:	34.45	36.89	35.91	35.42	34.94	34.92	32.75	31.67	0.00					
vert:	19.17	20.01	23.62	25.43	27.23	27.23	35.37	39.37	39.37					
Section at	396.98 aft													
trans:	0.00	2.72	4.92	6.84	8.06	9.22	10.07	11.53	12.64	13.50	14.19	15.23	15.87	16.02
vert:	5.62	6.04	6.44	6.88	7.22	7.63	8.01	8.82	9.66	10.53	11.41	13.20	14.95	15.83
trans:	16.03	15.86	15.41	13.48	21.84	22.57	23.29	24.22	25.45	26.18	26.90	29.01	31.12	33.23
vert:	16.94	18.05	20.02	27.23	27.23	26.20	25.17	23.84	22.08	21.04	20.01	19.68	19.42	19.23
trans:	34.45	35.67	36.89	35.91	34.93	34.92	32.75	31.67	0.00					
vert:	19.54	19.81	20.01	23.62	27.23	27.23	35.36	39.37	39.37					
Section at	410.10 aft													
trans:	0.00	1.99	3.62	4.89	6.17	8.12	9.35	11.06	11.69	12.71	13.46	14.07	14.99	15.57
vert:	7.77	7.96	8.16	8.35	8.58	9.03	9.42	10.18	10.56	11.37	12.18	12.99	14.52	15.89
trans:	15.75	15.66	15.41	14.10	13.48	16.24	21.84	24.23	23.31	18.72	0.00			
vert:	17.33	18.39	20.02	24.94	27.23	27.23	27.23	23.82	27.23	39.37	39.37			
Section at	417.19 aft													
trans:	0.00	2.06	3.68	4.86	6.22	8.17	9.42	11.17	11.80	12.76	13.42	14.21	14.85	15.29
vert:	8.95	9.10	9.25	9.40	9.61	10.03	10.39	11.13	11.50	12.26	13.02	14.10	15.18	16.06
trans:	15.54	15.55	15.41	13.48	16.24	13.26	11.65	0.00						
vert:	16.94	18.55	20.02	27.23	27.23	35.09	39.37	39.37						
Section at	419.95 aft													
trans:	0.00	2.19	3.81	4.85	6.19	8.19	9.45	11.21	11.85	12.77	13.40	14.16	14.79	15.22
vert:	9.40	9.54	9.67	9.81	10.01	10.41	10.77	11.48	11.85	12.59	13.33	14.37	15.42	16.25
trans:	15.47	15.50	15.41	14.42	13.48	13.48	12.86	10.23	0.00					
vert:	17.08	18.55	20.02	23.72	27.23	27.24	29.57	39.37	39.37					
Section at	431.61 aft													
trans:	0.00	2.25	3.84	4.86	6.17	8.12	9.49	11.10	11.79	12.73	13.23	13.87	14.50	14.83
vert:	11.26	11.33	11.42	11.52	11.68	12.01	12.33	12.91	13.21	13.87	14.49	15.39	16.31	16.92
trans:	15.16	15.30	15.41	14.44	13.48	13.48	12.85	10.23	0.00					
vert:	17.63	18.78	20.01	23.67	27.23	27.24	29.56	39.37	39.37					
Section at	443.26 aft													
trans:	0.00	2.41	4.54	6.48	7.99	9.40	10.37	11.78	12.52	12.95	14.17	14.84	14.99	15.41
vert:	13.02	13.04	13.15	13.35	13.58	13.87	14.12	14.63	15.11	15.60	17.11	18.11	18.48	20.01
trans:	15.09	14.76	14.12	13.48	11.33	10.23	0.00							
vert:	21.23	22.45	24.86	27.23	35.24	39.37	39.37							
Section at	456.30 aft													
trans:	0.00	2.36	4.32	6.11	7.45	8.83	9.73	11.07	11.80	12.27	13.50	14.39	14.64	15.41
vert:	14.89	14.89	15.01	15.18	15.35	15.60	15.77	16.14	16.47	16.77	17.77	18.55	18.84	20.01
trans:	15.09	14.76	14.12	13.48	11.33	10.23	0.00							
vert:	21.23	22.45	24.86	27.23	35.25	39.37	39.37							
Section at	469.33 aft													
trans:	0.00	3.09	5.56	7.51	10.31	12.04	13.10	14.11	14.91	15.41	14.85	14.30	13.75	13.48
vert:	16.56	16.62	16.79	17.00	17.42	17.92	18.44	18.98	19.51	20.01	22.10	24.17	26.22	27.23
trans:	10.23	0.00												
vert:	39.37	39.37												
Section at	483.02 aft													
trans:	0.00	5.49	7.45	9.02	10.21	12.58	13.86	14.85	15.41	14.90	14.41	13.93	13.48	11.35
vert:	18.04	18.26	18.38	18.50	18.62	19.04	19.37	19.69	20.01	21.92	23.76	25.54	27.23	35.19
trans:	10.23	0.00												
vert:	39.37	39.37												

Section at 495.41 aft

trans:	0.00	4.00	9.36	12.23	13.36	0.00
vert:	19.22	19.32	19.48	19.61	19.69	19.69

FOREPEAK.C Isometric Projection



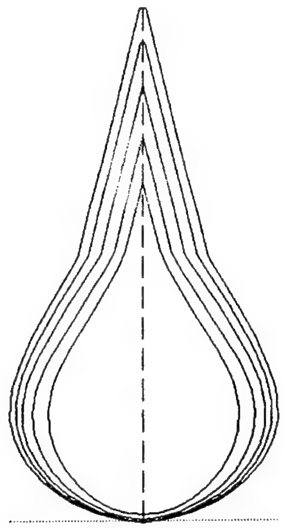
FOREPEAK.C Body Plan (1 component)
Scale = 1:150

Component 1: FOREPEAK.C 98.50% permeability

Offsets in Feet. Read across --->

Section at	21.00 fwd													
trans:	0.00	0.12	0.10	0.00										
vert:	9.76	10.90	12.05	13.20										
Section at	12.39 fwd													
trans:	0.00	1.55	2.44	3.44	4.23	4.78	5.01	4.88	4.39	3.53	2.31	1.18	0.40	0.00
vert:	1.36	1.65	2.28	3.41	4.85	6.49	8.19	9.87	11.62	13.57	15.92	18.27	20.88	22.36
Section at	0.00													
trans:	0.00	1.67	1.70	2.68	4.01	5.19	6.21	7.01	7.51	7.60	7.24	6.90	5.84	3.82
vert:	0.51	0.64	0.71	1.01	1.74	2.71	3.94	5.39	6.97	8.61	10.32	11.20	13.19	16.34
trans:	1.91	1.38	0.36	0.00										
vert:	19.49	20.66	24.49	25.82										

COMP_A.C Isometric Projection



COMP_A.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_A.C 98.50% permeability

Offsets in Feet. Read across --->

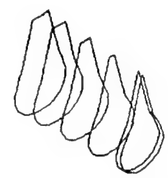
Section at	0.00													
trans:	0.00	1.67	1.70	2.68	4.01	5.19	6.21	7.01	7.51	7.60	7.24	6.90	5.84	3.82
vert:	0.51	0.64	0.71	1.01	1.74	2.71	3.94	5.39	6.97	8.61	10.32	11.20	13.19	16.34
trans:	1.91	1.38	0.36	0.00										
vert:	19.49	20.66	24.49	25.82										
Section at	12.39 aft													
trans:	0.00	1.23	2.80	3.96	4.86	6.16	7.26	8.12	8.68	8.85	8.57	7.81	7.27	5.71
vert:	0.03	0.24	0.65	1.13	1.62	2.64	3.84	5.23	6.75	8.34	10.00	11.84	12.82	15.26
trans:	4.07	3.17	2.36	1.42	0.55	0.00								
vert:	17.69	19.09	20.48	24.00	27.23	29.30								
Section at	26.07 aft													
trans:	0.00	1.39	2.53	3.42	4.51	6.11	7.33	8.37	9.14	9.58	9.62	9.24	8.41	6.06
vert:	-0.18	0.09	0.37	0.64	1.12	2.07	3.12	4.39	5.83	7.35	8.90	10.56	12.44	16.37
trans:	3.44	2.48	1.58	0.00										
vert:	20.31	23.88	27.23	33.13										

Section at 39.11 aft

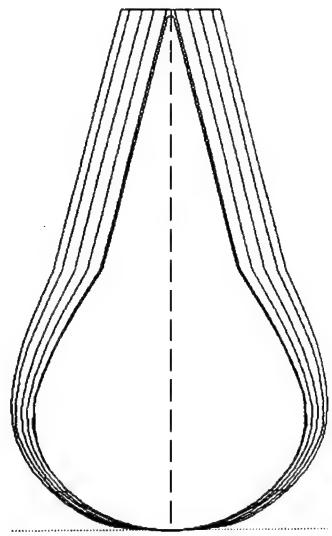
trans:	0.00	0.23	1.54	2.70	4.33	5.90	6.47	7.71	8.86	9.53	9.94	10.12	10.13	9.87
vert:	-0.12	-0.12	0.08	0.32	0.89	1.71	2.06	3.10	4.46	5.64	6.87	7.59	9.12	10.35
trans:	9.60	8.64	6.82	4.45	3.47	2.56	0.15	0.00						
vert:	11.22	13.34	16.49	20.19	23.81	27.23	36.25	36.25						

Section at 50.00 aft

trans:	0.00	0.42	1.66	2.85	4.19	5.72	6.77	8.04	9.26	9.85	10.25	10.56	10.55	10.40
vert:	-0.08	-0.06	0.06	0.28	0.70	1.41	2.05	3.07	4.51	5.49	6.48	7.79	9.31	10.17
trans:	9.89	8.83	7.46	5.29	4.30	3.38	3.29	0.24	0.00					
vert:	11.77	14.10	16.59	20.10	23.75	27.23	27.56	38.86	38.86					



COMP_B.C Isometric Projection



COMP_B.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_B.C 98.50% permeability

Offsets in Feet. Read across --->

Section at	50.00 aft													
trans:	0.00	0.42	1.66	2.85	4.19	5.72	6.77	8.04	9.26	9.85	10.25	10.56	10.55	10.40
vert:	-0.08	-0.06	0.06	0.28	0.70	1.41	2.05	3.07	4.51	5.49	6.48	7.79	9.31	10.17
trans:	9.89	8.83	7.46	5.29	4.30	3.38	3.29	0.24	0.00					
vert:	11.77	14.10	16.59	20.10	23.75	27.23	27.56	38.86	38.86					
Section at	52.15 aft													
trans:	0.00	0.46	1.68	2.88	4.16	5.69	6.83	8.10	9.34	9.91	10.31	10.65	10.63	10.50
vert:	-0.07	-0.05	0.06	0.27	0.66	1.36	2.05	3.07	4.52	5.46	6.40	7.84	9.35	10.13
trans:	9.95	8.87	7.58	5.46	4.47	3.54	3.43	0.29	0.00					
vert:	11.88	14.25	16.61	20.08	23.74	27.23	27.63	39.37	39.37					
Section at	65.18 aft													
trans:	0.00	1.36	2.49	3.60	4.77	6.17	7.16	8.42	9.65	10.23	10.66	11.04	11.08	10.98
vert:	-0.04	0.01	0.14	0.37	0.78	1.47	2.06	3.07	4.49	5.41	6.33	7.74	9.22	9.98
trans:	10.54	9.63	8.49	6.45	5.46	4.52	4.41	1.27	0.00					
vert:	11.69	14.03	16.37	20.02	23.71	27.23	27.63	39.37	39.37					

Section at 78.22 aft

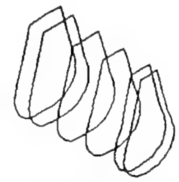
trans:	0.00	2.25	3.72	4.89	6.15	7.48	8.74	9.63	10.30	11.02	11.43	11.53	11.46	11.14
vert:	-0.01	0.06	0.28	0.67	1.27	2.07	3.07	3.99	4.92	6.27	7.65	9.10	9.84	11.49
trans:	10.39	9.39	8.46	7.44	5.50	3.38	2.24	0.00						
vert:	13.81	16.13	18.05	19.97	27.23	35.14	39.37	39.37						

Section at 91.26 aft

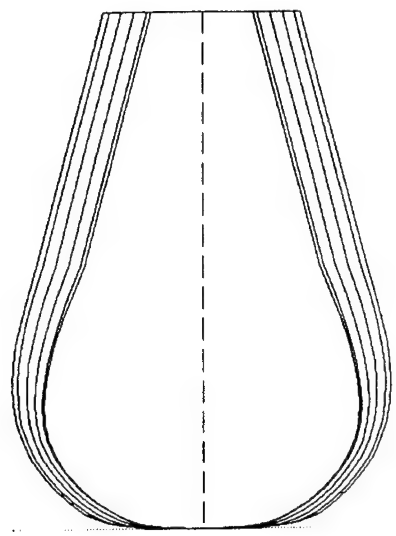
trans:	0.00	2.62	4.80	6.01	7.36	7.90	9.13	10.46	11.23	11.74	11.90	11.95	11.72	11.58
vert:	-0.00	0.06	0.47	0.97	1.73	2.08	3.08	4.62	5.89	7.25	7.94	9.79	11.37	12.11
trans:	11.00	10.20	9.39	8.42	6.79	6.47	4.37	3.22	0.00					
vert:	14.02	16.07	17.92	19.96	26.04	27.23	35.11	39.37	39.37					

Section at 100.00 aft

trans:	0.00	2.87	4.73	5.91	7.27	8.17	9.39	10.57	11.37	11.95	12.21	12.27	12.10	11.87
vert:	-0.00	0.06	0.34	0.77	1.50	2.10	3.09	4.41	5.64	6.98	8.13	9.75	11.29	12.53
trans:	11.42	10.74	10.01	9.08	7.66	7.13	5.03	3.88	0.00					
vert:	14.16	16.03	17.83	19.95	25.24	27.23	35.09	39.37	39.37					



COMP_C.C Isometric Projection



COMP_C.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_C.C 98.50% permeability

Offsets in Feet. Read across --->

Section at 100.00 aft

trans:	0.00	2.87	4.73	5.91	7.27	8.17	9.39	10.57	11.37	11.95	12.21	12.27	12.10	11.87
vert:	-0.00	0.06	0.34	0.77	1.50	2.10	3.09	4.41	5.64	6.98	8.13	9.75	11.29	12.53
trans:	11.42	10.74	10.01	9.08	7.66	7.13	5.03	3.88	0.00					
vert:	14.16	16.03	17.83	19.95	25.24	27.23	35.09	39.37	39.37					

Section at 104.30 aft

trans:	0.00	2.99	4.70	5.86	7.23	8.31	9.52	10.62	11.44	12.05	12.36	12.43	12.29	12.02
vert:	0.00	0.06	0.27	0.67	1.39	2.10	3.10	4.31	5.52	6.85	8.22	9.73	11.25	12.74
trans:	11.62	11.01	10.32	9.40	8.09	7.45	5.35	4.20	0.00					
vert:	14.23	16.01	17.79	19.95	24.84	27.23	35.08	39.37	39.37					

Section at 117.33 aft

trans:	0.00	3.38	5.14	6.21	7.62	8.84	10.01	11.04	11.86	12.49	12.87	12.98	12.92	12.69
vert:	0.00	0.05	0.22	0.56	1.28	2.11	3.12	4.25	5.43	6.75	8.27	9.67	11.19	12.81
trans:	12.38	11.87	11.27	10.38	9.14	8.43	6.34	5.18	0.00					
vert:	14.20	15.90	17.63	19.95	24.60	27.23	35.04	39.37	39.37					

Section at 130.37 aft

trans:	0.00	3.78	5.11	5.85	7.11	8.28	9.46	10.58	11.62	12.41	13.04	13.43	13.60	13.61
vert:	0.00	0.05	0.15	0.25	0.65	1.28	2.12	3.13	4.31	5.50	6.81	8.21	9.62	11.18
trans:	13.49	13.22	12.77	12.23	11.36	9.41	7.32	6.16	0.00					
vert:	12.63	14.07	15.78	17.49	19.94	27.23	35.01	39.37	39.37					

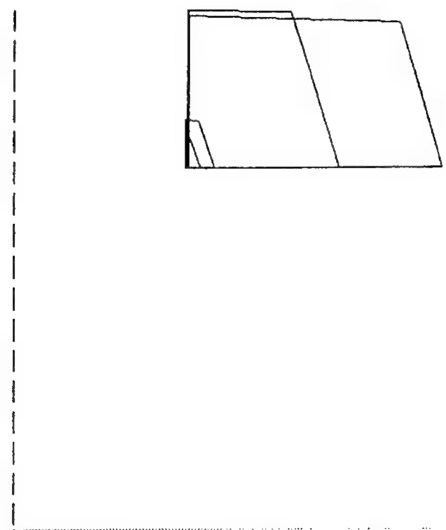
Section at 143.40 aft

trans:	0.00	4.15	5.52	6.30	7.63	8.84	10.12	11.20	12.21	12.99	13.63	14.06	14.29	14.36
vert:	0.00	0.05	0.15	0.22	0.59	1.21	2.13	3.14	4.32	5.50	6.81	8.23	9.67	11.24
trans:	14.28	14.05	13.64	13.16	12.34	10.39	8.28	7.13	0.00					
vert:	12.67	14.09	15.75	17.46	19.94	27.23	35.00	39.37	39.37					

Section at 150.00 aft

trans:	0.00	4.32	7.30	8.63	9.25	10.47	11.55	12.55	13.32	13.97	14.42	14.67	14.76	14.70
vert:	0.00	0.04	0.40	0.90	1.23	2.13	3.14	4.33	5.50	6.82	8.25	9.69	11.27	12.69
trans:	14.49	13.69	12.84	10.89	8.79	7.63	0.00							
vert:	14.11	17.25	19.94	27.23	34.99	39.37	39.37							

COMP_N.S Isometric Projection



COMP_N.S Body Plan (1 component)
Scale = 1:150

Component 1: COMP_N.S 98.50% permeability

Offsets in Feet. Read across --->

Section at 181.35 aft

trans:	13.21	14.38	13.21	13.21
vert:	27.23	27.23	30.33	27.23

Section at 182.52 aft

trans:	13.22	13.25	15.48	14.20	14.19	13.22	13.22
vert:	27.23	27.23	27.23	30.81	30.81	30.84	27.23

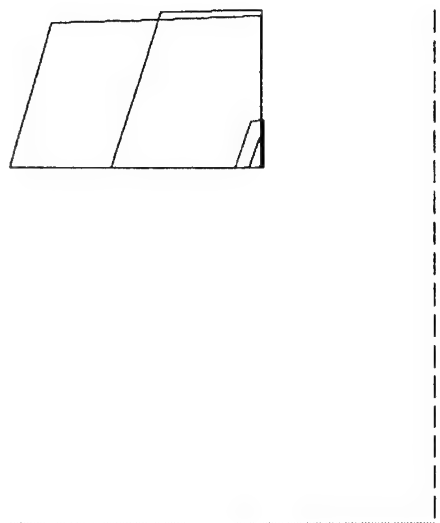
Section at 192.88 aft

trans:	13.35	24.38	25.23	22.71	21.33	13.35	13.35
vert:	27.23	27.23	27.23	35.10	39.30	39.37	27.23

Section at 201.00 aft

trans:	13.45	31.49	32.82	32.25	30.59	29.94	29.76	29.72	13.45	13.45
vert:	27.23	27.23	27.23	29.30	35.25	37.68	38.33	38.45	38.95	27.23

COMP_N.P Isometric Projection



Port

COMP_N.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_N.P 98.50% permeability

Offsets in Feet. Read across --->

Section at 181.35 aft

trans:	13.21	14.38	13.21	13.21
vert:	27.23	27.23	30.33	27.23

Section at 182.52 aft

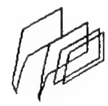
trans:	13.22	13.25	15.48	14.20	14.19	13.22	13.22
vert:	27.23	27.23	27.23	30.81	30.81	30.84	27.23

Section at 192.88 aft

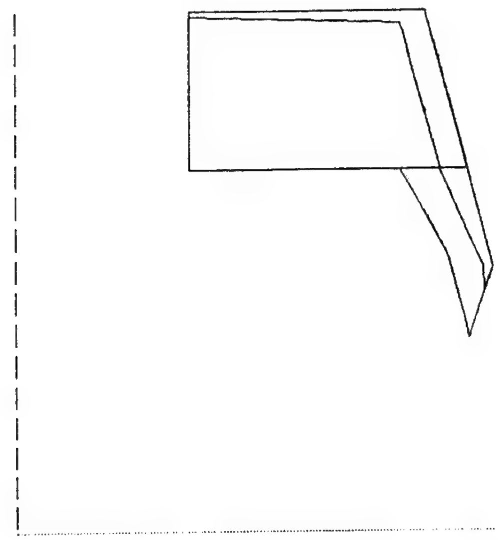
trans:	13.35	24.38	25.23	22.71	21.33	13.35	13.35
vert:	27.23	27.23	27.23	35.10	39.30	39.37	27.23

Section at 201.00 aft

trans:	13.45	31.49	32.82	32.25	30.59	29.94	29.76	29.72	13.45	13.45
vert:	27.23	27.23	27.23	29.30	35.25	37.68	38.33	38.45	38.95	27.23



COMP_P.S Isometric Projection



COMP_P.S Body Plan (1 component)
Scale = 1:150

Component 1: COMP_P.S 98.50% permeability

Offsets in Feet. Read across --->

Section at 201.00 aft

trans:	13.45	31.49	32.82	32.25	30.59	29.94	29.76	29.72	13.45	13.45
vert:	27.23	27.23	27.23	29.30	35.25	37.68	38.33	38.45	38.95	27.23

Section at 203.24 aft

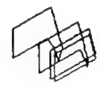
trans:	13.45	33.21	34.92	34.77	31.66	31.66	13.45	13.45
vert:	27.23	27.23	27.23	27.80	39.36	39.37	39.37	27.23

Section at 208.59 aft

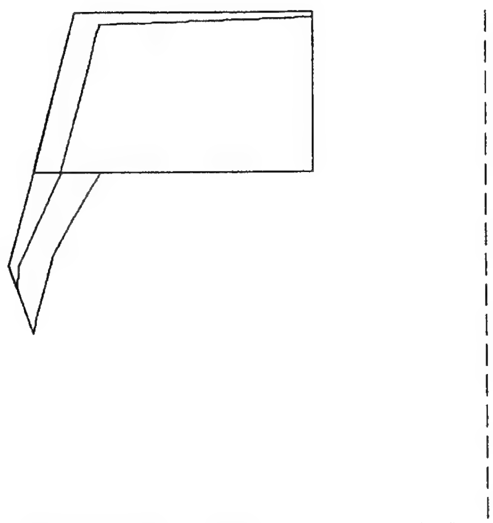
trans:	13.46	13.46	13.46	32.73	33.41	34.08	34.76	35.43	36.10	36.24	36.61	36.89	36.56	36.23
vert:	27.23	27.23	27.23	27.23	25.79	24.34	22.90	21.46	20.01	18.16	19.22	20.01	21.22	22.42
trans:	35.91	35.58	35.25	34.92	33.34	31.67	13.46	13.46						
vert:	23.62	24.83	26.03	27.23	33.19	39.37	39.37	27.23						

Section at 221.00 aft

trans:	13.47	29.67	30.57	31.17	32.10	33.38	34.35	34.76	35.00	35.01	36.81	36.89	36.48	35.91
vert:	27.23	27.23	25.69	24.76	23.14	20.77	17.51	16.05	14.75	14.72	19.78	20.01	21.51	23.62
trans:	35.50	34.92	33.63	31.67	13.47	13.47								
vert:	25.11	27.23	32.11	39.37	39.37	27.23								



COMP_P.P Isometric Projection



COMP_P.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_P.P   98.50% permeability

Offsets in Feet. Read across --->

Section at 201.00 aft

trans:	13.45	31.49	32.82	32.25	30.59	29.94	29.76	29.72	13.45	13.45
vert:	27.23	27.23	27.23	29.30	35.25	37.68	38.33	38.45	38.95	27.23

Section at 203.24 aft

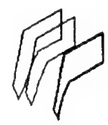
trans:	13.45	33.21	34.92	34.77	31.66	31.66	13.45	13.45
vert:	27.23	27.23	27.23	27.80	39.36	39.37	39.37	27.23

Section at 208.59 aft

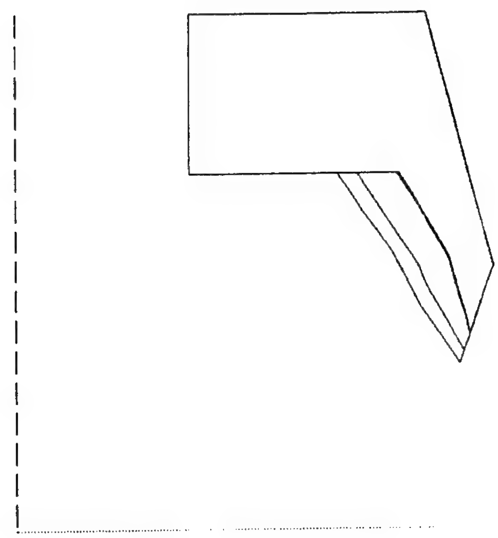
trans:	13.46	13.46	13.46	32.73	33.41	34.08	34.76	35.43	36.10	36.24	36.61	36.89	36.56	36.23
vert:	27.23	27.23	27.23	27.23	25.79	24.34	22.90	21.46	20.01	18.16	19.22	20.01	21.22	22.42
trans:	35.91	35.58	35.25	34.92	33.34	31.67	13.46	13.46						
vert:	23.62	24.83	26.03	27.23	33.19	39.37	39.37	27.23						

Section at 221.00 aft

trans:	13.47	29.67	30.57	31.17	32.10	33.38	34.35	34.76	35.00	35.01	36.81	36.89	36.48	35.91
vert:	27.23	27.23	25.69	24.76	23.14	20.77	17.51	16.05	14.75	14.72	19.78	20.01	21.51	23.62
trans:	35.50	34.92	33.63	31.67	13.47	13.47								
vert:	25.11	27.23	32.11	39.37	39.37	27.23								



COMP_Q.S Isometric Projection



COMP_Q.S Body Plan (1 component)
Scale = 1:150

Component 1: COMP_Q.S 98.50% permeability

Offsets in Feet. Read across --->

Section at 221.00 aft

trans:	13.47	29.67	30.57	31.17	32.10	33.38	34.35	34.76	35.00	35.01	36.81	36.89	36.48	35.91
vert:	27.23	27.23	25.69	24.76	23.14	20.77	17.51	16.05	14.75	14.72	19.78	20.01	21.51	23.62
trans:	35.50	34.92	33.63	31.67	13.47	13.47								
vert:	25.11	27.23	32.11	39.37	39.37	27.23								

Section at 221.63 aft

trans:	13.47	29.51	29.52	29.52	30.47	31.06	32.00	33.28	33.30	33.31	33.36	34.25	34.69	34.77
vert:	27.23	27.23	27.23	27.23	25.60	24.71	23.08	20.73	20.67	20.65	20.46	17.48	15.94	15.49
trans:	35.00	35.41	36.25	36.89	36.48	35.91	35.50	34.92	33.66	31.67	13.47	13.47		
vert:	14.69	15.83	18.20	20.01	21.52	23.62	25.13	27.23	31.99	39.37	39.37	27.23		

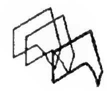
Section at 234.67 aft

trans:	13.48	13.48	13.48	26.30	26.30	26.44	30.52	31.13	31.59	31.83	34.53	34.57	35.10	35.66
vert:	27.23	27.23	27.23	27.23	27.23	27.23	20.91	20.01	18.69	18.20	13.38	13.51	14.98	16.56
trans:	36.26	36.89	36.89	36.40	35.91	35.42	34.92	33.79	31.67	13.48	13.48			
vert:	18.24	20.01	20.01	21.82	23.62	25.43	27.23	31.52	39.37	39.37	27.23			

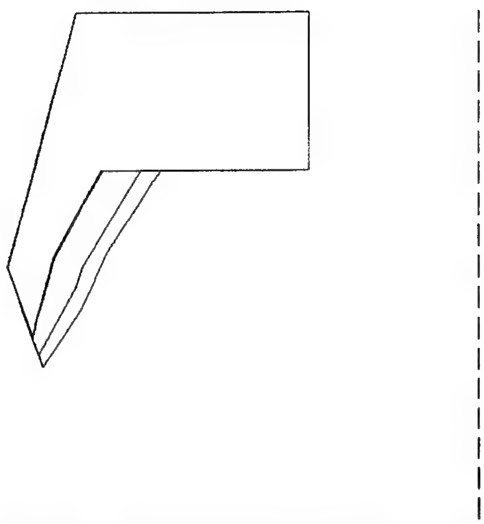
Section at 241.00 aft

trans:	13.48	13.48	24.95	24.95	25.16	25.53	26.77	26.91	27.95	29.23	31.11	34.21	34.48	35.03
vert:	27.23	27.23	27.23	27.23	26.92	26.38	24.55	24.34	22.82	20.94	17.01	12.49	13.26	14.79

trans:	35.61	36.26	36.89	36.89	36.69	35.92	33.81	31.72	31.67	13.48	13.48
vert:	16.43	18.24	20.00	20.01	20.75	23.62	31.43	39.18	39.37	39.37	27.23



COMP_Q.P Isometric Projection



Port

COMP_Q.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_Q.P 98.50% permeability

Offsets in Feet. Read across --->

Section at 221.00 aft

trans:	13.47	29.67	30.57	31.17	32.10	33.38	34.35	34.76	35.00	35.01	36.81	36.89	36.48	35.91
vert:	27.23	27.23	25.69	24.76	23.14	20.77	17.51	16.05	14.75	14.72	19.78	20.01	21.51	23.62
trans:	35.50	34.92	33.63	31.67	13.47	13.47								
vert:	25.11	27.23	32.11	39.37	39.37	27.23								

Section at 221.63 aft

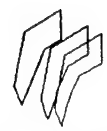
trans:	13.47	29.51	29.52	29.52	30.47	31.06	32.00	33.28	33.30	33.31	33.36	34.25	34.69	34.77
vert:	27.23	27.23	27.23	27.23	25.60	24.71	23.08	20.73	20.67	20.65	20.46	17.48	15.94	15.49
trans:	35.00	35.41	36.25	36.89	36.48	35.91	35.50	34.92	33.66	31.67	13.47	13.47		
vert:	14.69	15.83	18.20	20.01	21.52	23.62	25.13	27.23	31.99	39.37	39.37	27.23		

Section at 234.67 aft

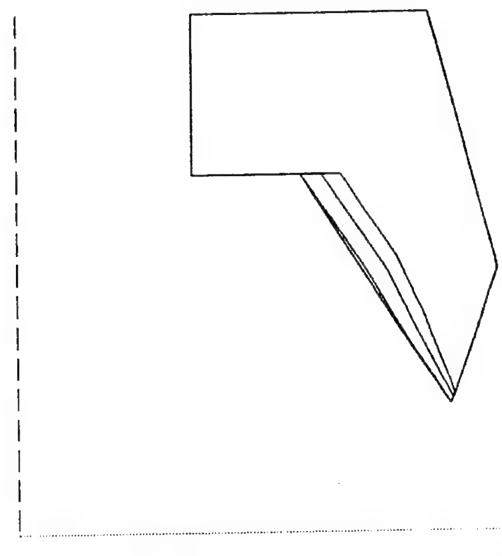
trans:	13.48	13.48	13.48	26.30	26.30	26.44	30.52	31.13	31.59	31.83	34.53	34.57	35.10	35.66
vert:	27.23	27.23	27.23	27.23	27.23	27.23	20.91	20.01	18.69	18.20	13.38	13.51	14.98	16.56
trans:	36.26	36.89	36.89	36.40	35.91	35.42	34.92	33.79	31.67	13.48	13.48			
vert:	18.24	20.01	20.01	21.82	23.62	25.43	27.23	31.52	39.37	39.37	27.23			

Section at 241.00 aft

trans:	13.48	13.48	24.95	24.95	25.16	25.53	26.77	26.91	27.95	29.23	31.11	34.21	34.48	35.03
vert:	27.23	27.23	27.23	27.23	26.92	26.38	24.55	24.34	22.82	20.94	17.01	12.49	13.26	14.79
trans:	35.61	36.26	36.89	36.89	36.69	35.92	33.81	31.72	31.67	13.48	13.48			
vert:	16.43	18.24	20.00	20.01	20.75	23.62	31.43	39.18	39.37	39.37	27.23			



COMP_R.S Isometric Projection



COMP_R.S Body Plan (1 component)
Scale = 1:150

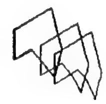
Component 1: COMP_R.S 98.50% permeability

Offsets in Feet. Read across --->

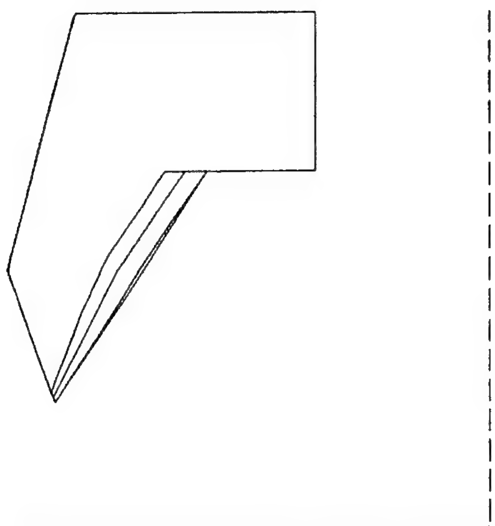
Section at	241.00 aft													
trans:	13.48	13.48	24.95	24.95	24.95	24.98	25.53	26.77	27.95	29.23	31.09	31.11	32.32	33.13
vert:	27.23	27.23	27.23	27.23	27.23	27.18	26.38	24.55	22.81	20.94	17.04	17.01	13.79	11.72
trans:	33.47	33.53	33.76	34.48	35.01	35.07	35.61	36.26	36.70	36.89	36.69	35.92	33.81	31.72
vert:	10.73	10.57	11.22	13.26	14.72	14.90	16.43	18.24	19.49	20.01	20.75	23.62	31.43	39.18
trans:	31.67	13.48	13.48											
vert:	39.37	39.37	27.23											
Section at	247.71 aft													
trans:	13.48	13.48	23.51	28.49	29.88	29.96	32.34	32.72	33.39	34.39	35.50	35.56	36.25	36.82
vert:	27.23	27.23	27.23	20.01	17.24	17.07	12.30	11.56	10.20	12.99	16.11	16.29	18.24	19.82
trans:	36.71	36.40	35.91	35.92	35.42	34.92	33.84	31.78	31.67	13.48	13.48			
vert:	20.68	21.82	23.62	23.62	25.43	27.23	31.34	38.97	39.37	39.37	27.23			
Section at	260.74 aft													
trans:	13.48	21.84	21.84	24.38	26.91	30.10	31.87	33.24	34.14	35.13	35.67	36.25	36.61	36.89
vert:	27.23	27.23	27.23	23.62	20.01	14.85	12.01	9.79	12.30	15.08	16.60	18.24	19.24	20.01
trans:	36.30	35.91	35.91	35.42	34.92	32.75	31.67	13.48	13.48					
vert:	22.20	23.62	23.62	25.43	27.23	35.47	39.37	39.37	27.23					

Section at 261.00 aft

trans:	13.48	13.48	21.83	33.21	33.24	33.42	34.89	35.67	36.25	36.87	36.89	36.89	36.69	35.91
vert:	27.23	27.23	27.23	9.84	9.79	10.30	14.41	16.60	18.24	19.95	20.01	20:01	20.73	23.62
trans:	35.42	34.92	33.91	31.76	31.67	13.48	13.48							
vert:	25.43	27.23	31.07	39.02	39.37	39.37	27.23							



COMP_R.P Isometric Projection



Port

COMP_R.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_R.P 98.50% permeability

Offsets in Feet. Read across --->

Section at 241.00 aft

trans:	13.48	13.48	24.95	24.95	24.95	24.98	25.53	26.77	27.95	29.23	31.09	31.11	32.32	33.13
vert:	27.23	27.23	27.23	27.23	27.23	27.18	26.38	24.55	22.81	20.94	17.04	17.01	13.79	11.72
trans:	33.47	33.53	33.76	34.48	35.01	35.07	35.61	36.26	36.70	36.89	36.69	35.92	33.81	31.72
vert:	10.73	10.57	11.22	13.26	14.72	14.90	16.43	18.24	19.49	20.01	20.75	23.62	31.43	39.18
trans:	31.67	13.48	13.48											
vert:	39.37	39.37	27.23											

Section at 247.71 aft

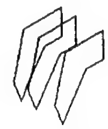
trans:	13.48	13.48	23.51	28.49	29.88	29.96	32.34	32.72	33.39	34.39	35.50	35.56	36.25	36.82
vert:	27.23	27.23	27.23	20.01	17.24	17.07	12.30	11.56	10.20	12.99	16.11	16.29	18.24	19.82
trans:	36.71	36.40	35.91	35.92	35.42	34.92	33.84	31.78	31.67	13.48	13.48			
vert:	20.68	21.82	23.62	23.62	25.43	27.23	31.34	38.97	39.37	39.37	27.23			

Section at 260.74 aft

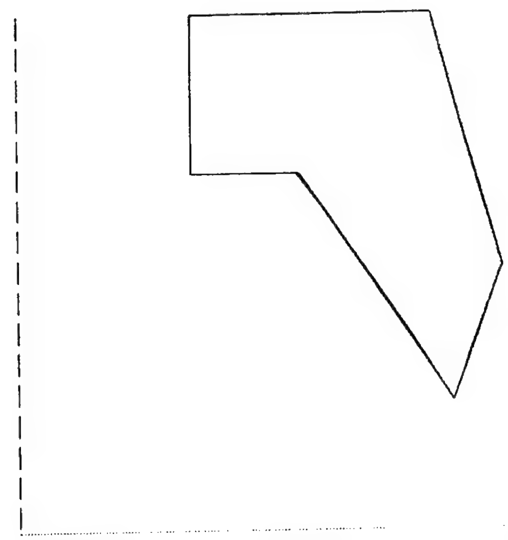
trans:	13.48	21.84	21.84	24.38	26.91	30.10	31.87	33.24	34.14	35.13	35.67	36.25	36.61	36.89
vert:	27.23	27.23	27.23	23.62	20.01	14.85	12.01	9.79	12.30	15.08	16.60	18.24	19.24	20.01
trans:	36.30	35.91	35.91	35.42	34.92	32.75	31.67	13.48	13.48					
vert:	22.20	23.62	23.62	25.43	27.23	35.47	39.37	39.37	27.23					

Section at 261.00 aft

trans:	13.48	13.48	21.83	33.21	33.24	33.42	34.89	35.67	36.25	36.87	36.89	36.89	36.69	35.91
vert:	27.23	27.23	27.23	9.84	9.79	10.30	14.41	16.60	18.24	19.95	20.01	20.01	20.73	23.62
trans:	35.42	34.92	33.91	31.76	31.67	13.48	13.48							
vert:	25.43	27.23	31.07	39.02	39.37	39.37	27.23							



COMP_S.S Isometric Projection



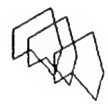
Stbd

COMP_S.S Body Plan (1 component)
Scale = 1:150

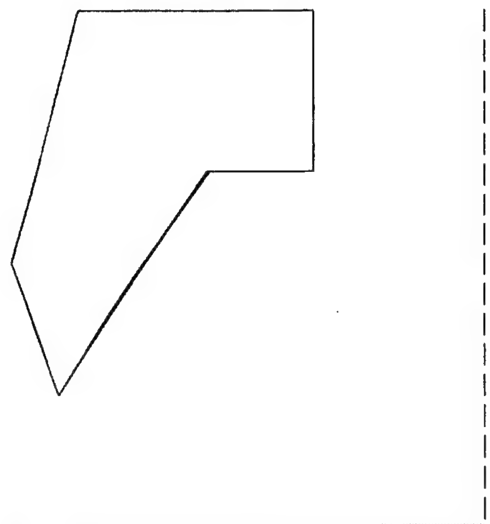
Component 1: COMP_S.S 98.50% permeability

Offsets in Feet. Read across --->

Section at	261.00 aft													
trans:	13.48	13.48	21.83	33.21	33.24	33.42	34.89	35.67	36.25	36.87	36.89	36.89	36.69	35.91
vert:	27.23	27.23	27.23	9.84	9.79	10.30	14.41	16.60	18.24	19.95	20.01	20.01	20.73	23.62
trans:	35.42	34.92	33.91	31.76	31.67	13.48	13.48							
vert:	25.43	27.23	31.07	39.02	39.37	39.37	27.23							
Section at	273.77 aft													
trans:	13.48	13.48	21.28	21.68	33.23	35.11	35.67	36.25	36.82	36.89	36.73	36.40	35.91	35.42
vert:	27.23	27.23	27.23	27.23	9.83	15.06	16.63	18.25	19.81	20.01	20.59	21.82	23.62	25.43
trans:	34.92	33.92	31.76	31.67	13.48	13.48								
vert:	27.23	31.04	39.02	39.37	39.37	27.23								
Section at	281.00 aft													
trans:	13.48	13.48	21.59	26.67	29.95	31.79	33.13	33.22	33.88	34.43	35.67	36.26	36.67	36.89
vert:	27.23	27.23	27.23	20.01	14.94	12.09	9.99	9.85	11.69	13.20	16.65	18.26	19.39	20.01
trans:	36.71	33.91	31.71	31.67	13.48	13.48								
vert:	20.68	31.05	39.20	39.37	39.37	27.23								



COMP_S.P Isometric Projection



Port

COMP_S.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_S.P 98.50% permeability

Offsets in Feet. Read across --->

Section at 261.00 aft

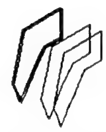
trans:	13.48	13.48	21.83	33.21	33.24	33.42	34.89	35.67	36.25	36.87	36.89	36.89	36.69	35.91
vert:	27.23	27.23	27.23	9.84	9.79	10.30	14.41	16.60	18.24	19.95	20.01	20.01	20.73	23.62
trans:	35.42	34.92	33.91	31.76	31.67	13.48	13.48							
vert:	25.43	27.23	31.07	39.02	39.37	39.37	27.23							

Section at 273.77 aft

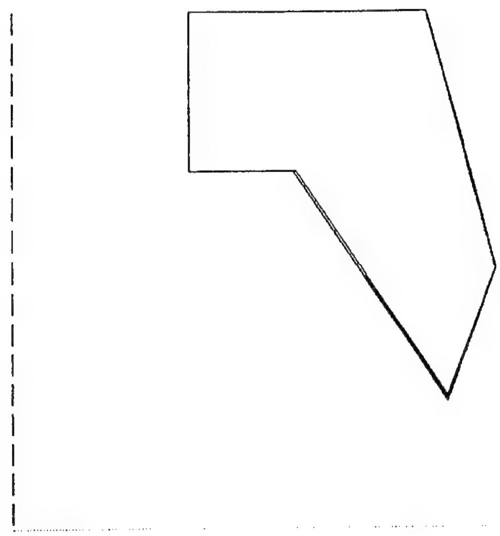
trans:	13.48	13.48	21.28	21.68	33.23	35.11	35.67	36.25	36.82	36.89	36.73	36.40	35.91	35.42
vert:	27.23	27.23	27.23	27.23	9.83	15.06	16.63	18.25	19.81	20.01	20.59	21.82	23.62	25.43
trans:	34.92	33.92	31.76	31.67	13.48	13.48								
vert:	27.23	31.04	39.02	39.37	39.37	27.23								

Section at 281.00 aft

trans:	13.48	13.48	21.59	26.67	29.95	31.79	33.13	33.22	33.88	34.43	35.67	36.26	36.67	36.89
vert:	27.23	27.23	27.23	20.01	14.94	12.09	9.99	9.85	11.69	13.20	16.65	18.26	19.39	20.01
trans:	36.71	33.91	31.71	31.67	13.48	13.48								
vert:	20.68	31.05	39.20	39.37	39.37	27.23								



COMP_T.S Isometric Projection



COMP_T.S Body Plan (1 component)
Scale = 1:150

Component 1: COMP_T.S 98.50% permeability

Offsets in Feet. Read across --->

Section at 281.00 aft

trans:	13.48	13.48	21.59	26.67	29.95	31.79	33.13	33.22	33.88	34.43	35.67	36.26	36.67	36.89
vert:	27.23	27.23	27.23	20.01	14.94	12.09	9.99	9.85	11.69	13.20	16.65	18.26	19.39	20.01
trans:	36.71	33.91	31.71	31.67	13.48	13.48								
vert:	20.68	31.05	39.20	39.37	39.37	27.23								

Section at 286.81 aft

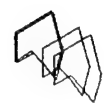
trans:	13.48	13.48	21.84	26.90	30.13	31.88	33.23	36.89	33.92	31.71	31.67	13.48	13.48
vert:	27.23	27.23	27.23	20.01	14.89	12.11	9.98	20.01	31.04	39.20	39.37	39.37	27.23

Section at 299.85 aft

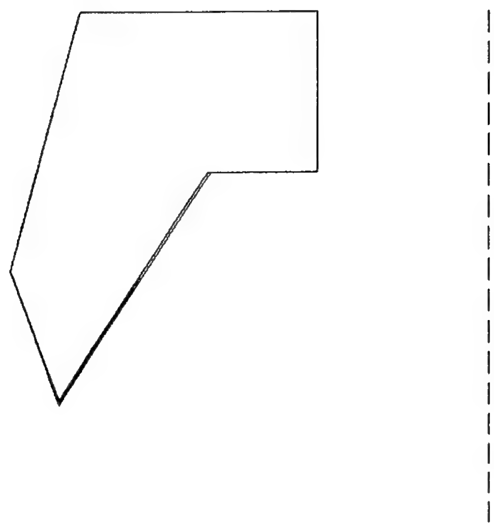
trans:	13.48	13.48	13.48	21.84	26.90	30.66	33.24	33.91	34.08	34.98	35.40	36.89	35.42	34.92
vert:	27.23	27.23	27.23	27.23	20.01	14.25	10.24	12.05	12.48	14.90	16.05	20.01	25.43	27.23
trans:	33.87	31.67	13.48	13.48										
vert:	31.22	39.37	39.37	27.23										

Section at 301.00 aft

trans:	13.48	13.48	13.48	21.84	26.90	30.70	33.24	33.89	34.12	34.88	35.38	36.89	35.42	34.92
vert:	27.23	27.23	27.23	27.23	20.01	14.19	10.26	12.01	12.61	14.65	16.00	20.01	25.43	27.23
trans:	33.86	31.67	13.48	13.48										
vert:	31.26	39.37	39.37	27.23										



COMP_T.P Isometric Projection



Port

COMP_T.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_T.P 98.50% permeability

Offsets in Feet. Read across --->

Section at 281.00 aft

trans:	13.48	13.48	21.59	26.67	29.95	31.79	33.13	33.22	33.88	34.43	35.67	36.26	36.67	36.89
vert:	27.23	27.23	27.23	20.01	14.94	12.09	9.99	9.85	11.69	13.20	16.65	18.26	19.39	20.01
trans:	36.71	33.91	31.71	31.67	13.48	13.48								
vert:	20.68	31.05	39.20	39.37	39.37	27.23								

Section at 286.81 aft

trans:	13.48	13.48	21.84	26.90	30.13	31.88	33.23	36.89	33.92	31.71	31.67	13.48	13.48
vert:	27.23	27.23	27.23	20.01	14.89	12.11	9.98	20.01	31.04	39.20	39.37	39.37	27.23

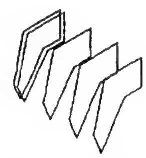
Section at 299.85 aft

trans:	13.48	13.48	13.48	21.84	26.90	30.66	33.24	33.91	34.08	34.98	35.40	36.89	35.42	34.92
vert:	27.23	27.23	27.23	27.23	20.01	14.25	10.24	12.05	12.48	14.90	16.05	20.01	25.43	27.23
trans:	33.87	31.67	13.48	13.48										
vert:	31.22	39.37	39.37	27.23										

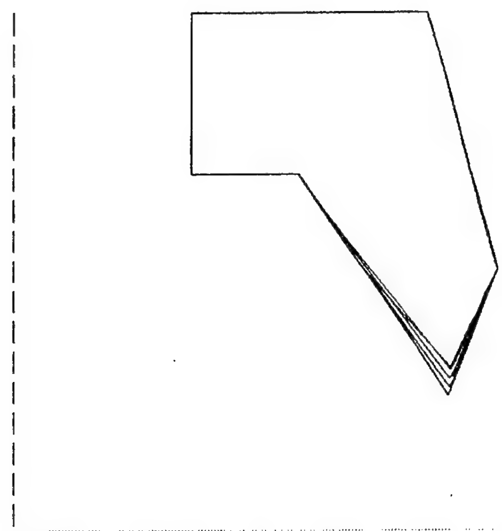
Section at 301.00 aft

trans:	13.48	13.48	13.48	21.84	26.90	30.70	33.24	33.89	34.12	34.88	35.38	36.89	35.42	34.92
vert:	27.23	27.23	27.23	27.23	20.01	14.19	10.26	12.01	12.61	14.65	16.00	20.01	25.43	27.23

trans:	33.86	31.67	13.48	13.48
vert:	31.26	39.37	39.37	27.23



COMP_U.S Isometric Projection



Stbd

COMP_U.S Body Plan (1 component)
Scale = 1:150

Component 1: COMP_U.S 98.50% permeability

Offsets in Feet. Read across --->

Section at 301.00 aft

trans:	13.48	13.48	13.48	21.84	26.90	30.70	33.24	33.89	34.36	35.38	36.89	35.42	34.92	32.77
vert:	27.23	27.23	27.23	27.23	20.01	14.19	10.26	12.01	13.24	16.00	20.01	25.43	27.23	35.40

trans:	31.67	13.48	13.48
vert:	39.37	39.37	27.23

Section at 312.89 aft

trans:	13.48	21.84	26.90	27.05	33.28	33.55	33.68	34.14	34.63	35.14	36.89	36.40	35.91	35.42
vert:	27.23	27.23	20.01	19.79	10.88	11.33	11.66	12.86	14.12	15.45	20.01	21.82	23.62	25.43

trans:	34.92	32.77	31.67	13.48	13.48
vert:	27.23	35.38	39.37	39.37	27.23

Section at 325.92 aft

trans:	13.48	21.84	21.84	21.87	33.32	33.54	34.89	35.51	36.17	36.89	36.45	36.10	35.71	35.37
vert:	27.23	27.23	27.23	27.19	11.57	11.90	15.17	16.67	18.27	20.01	21.64	22.90	24.34	25.61

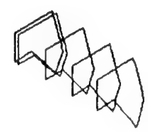
trans:	34.92	32.78	31.67	13.48	13.48
vert:	27.23	35.37	39.37	39.37	27.23

Section at 338.96 aft

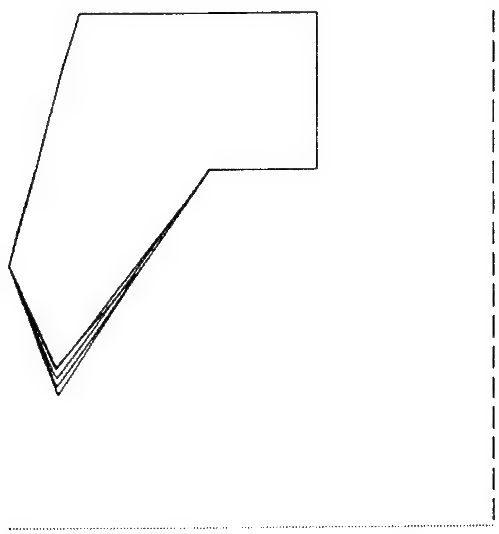
trans:	13.48	21.84	21.84	21.85	33.36	33.54	34.89	35.51	36.17	36.89	36.50	36.10	35.71	35.32
vert:	27.23	27.23	27.23	27.21	12.25	12.50	15.53	16.92	18.40	20.01	21.46	22.90	24.34	25.79
trans:	34.92	32.78	31.67	13.48	13.48									
vert:	27.23	35.35	39.37	39.37	27.23									

Section at 341.00 aft

trans:	13.48	21.84	24.42	26.16	26.90	33.36	33.37	34.81	35.44	36.16	36.89	36.50	36.11	35.70
vert:	27.23	27.23	23.56	21.06	20.01	12.37	12.36	15.56	16.91	18.44	20.01	21.44	22.86	24.38
trans:	35.32	34.92	32.78	31.67	13.48	13.48								
vert:	25.81	27.23	35.35	39.37	39.37	27.23								



COMP_U.P Isometric Projection



Port

COMP_U.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_U.P   98.50% permeability

Offsets in Feet. Read across --->

Section at 301.00 aft

trans:	13.48	13.48	13.48	21.84	26.90	30.70	33.24	33.89	34.36	35.38	36.89	35.42	34.92	32.77
vert:	27.23	27.23	27.23	27.23	20.01	14.19	10.26	12.01	13.24	16.00	20.01	25.43	27.23	35.40
trans:	31.67	13.48	13.48											
vert:	39.37	39.37	27.23											

Section at 312.89 aft

trans:	13.48	21.84	26.90	27.05	33.28	33.55	33.68	34.14	34.63	35.14	36.89	36.40	35.91	35.42
vert:	27.23	27.23	20.01	19.79	10.88	11.33	11.66	12.86	14.12	15.45	20.01	21.82	23.62	25.43
trans:	34.92	32.77	31.67	13.48	13.48									
vert:	27.23	35.38	39.37	39.37	27.23									

Section at 325.92 aft

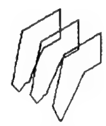
trans:	13.48	21.84	21.84	21.87	33.32	33.54	34.89	35.51	36.17	36.89	36.45	36.10	35.71	35.37
vert:	27.23	27.23	27.23	27.19	11.57	11.90	15.17	16.67	18.27	20.01	21.64	22.90	24.34	25.61
trans:	34.92	32.78	31.67	13.48	13.48									
vert:	27.23	35.37	39.37	39.37	27.23									

Section at 338.96 aft

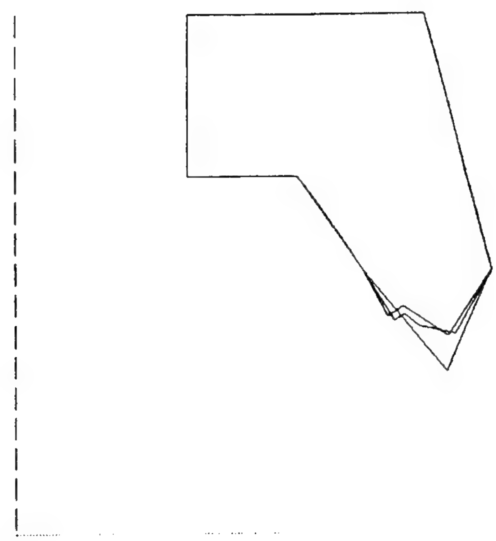
trans:	13.48	21.84	21.84	21.85	33.36	33.54	34.89	35.51	36.17	36.89	36.50	36.10	35.71	35.32
vert:	27.23	27.23	27.23	27.21	12.25	12.50	15.53	16.92	18.40	20.01	21.46	22.90	24.34	25.79
trans:	34.92	32.78	31.67	13.48	13.48									
vert:	27.23	35.35	39.37	39.37	27.23									

Section at 341.00 aft

trans:	13.48	21.84	24.42	26.16	26.90	33.36	33.37	34.81	35.44	36.16	36.89	36.50	36.11	35.70
vert:	27.23	27.23	23.56	21.06	20.01	12.37	12.36	15.56	16.91	18.44	20.01	21.44	22.86	24.38
trans:	35.32	34.92	32.78	31.67	13.48	13.48								
vert:	25.81	27.23	35.35	39.37	39.37	27.23								



COMP_V.S Isometric Projection



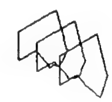
Stbd

COMP_V.S Body Plan (1 component)
Scale = 1:150

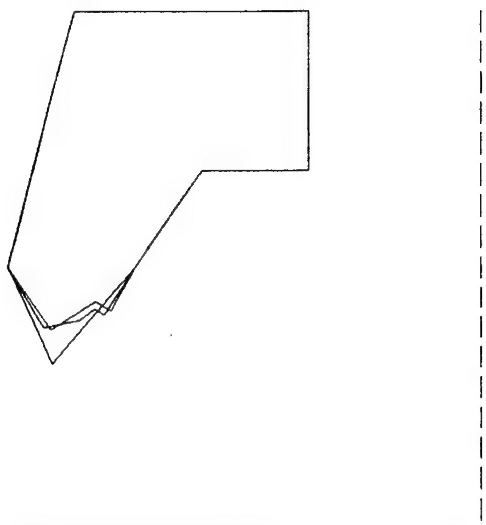
Component 1: COMP_V.S 98.50% permeability

Offsets in Feet. Read across --->

Section at	341.00 aft													
trans:	13.48	21.84	24.42	26.16	26.90	33.36	33.37	34.81	34.83	36.89	36.89	36.78	35.71	33.87
vert:	27.23	27.23	23.56	21.06	20.01	12.37	12.36	15.56	15.55	20.01	20.01	20.43	24.38	31.22
trans:	31.73	31.67	13.48	13.48										
vert:	39.14	39.37	39.37	27.23										
Section at	352.00 aft													
trans:	13.48	13.48	21.84	23.95	24.66	26.90	29.35	30.04	31.19	34.07	34.40	35.05	36.13	36.13
vert:	27.23	27.23	27.23	24.23	23.20	20.01	16.26	16.71	15.80	15.24	15.70	16.88	18.65	18.65
trans:	36.89	36.53	36.17	36.01	35.65	35.29	34.92	34.92	33.78	31.74	31.67	13.48	13.48	
vert:	20.01	21.34	22.66	23.26	24.59	25.91	27.23	27.23	31.55	39.11	39.37	39.37	27.23	
Section at	361.00 aft													
trans:	13.48	21.84	23.66	24.09	24.86	25.95	26.17	26.90	28.77	28.80	29.97	33.50	33.54	36.89
vert:	27.23	27.23	24.64	24.03	22.92	21.37	21.05	20.01	16.61	16.56	17.32	15.05	15.12	20.01
trans:	36.55	36.22	35.94	35.60	35.27	34.93	34.92	33.77	31.67	13.48	13.48			
vert:	21.26	22.49	23.51	24.75	25.99	27.23	27.23	31.57	39.37	39.37	27.23			



COMP_V.P Isometric Projection



COMP_V.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_V.P 98.50% permeability

Offsets in Feet. Read across --->

Section at 341.00 aft

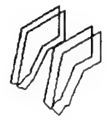
trans:	13.48	21.84	24.42	26.16	26.90	33.36	33.37	34.81	34.83	36.89	36.89	36.78	35.71	33.87
vert:	27.23	27.23	23.56	21.06	20.01	12.37	12.36	15.56	15.55	20.01	20.01	20.43	24.38	31.22
trans:	31.73	31.67	13.48	13.48										
vert:	39.14	39.37	39.37	27.23										

Section at 352.00 aft

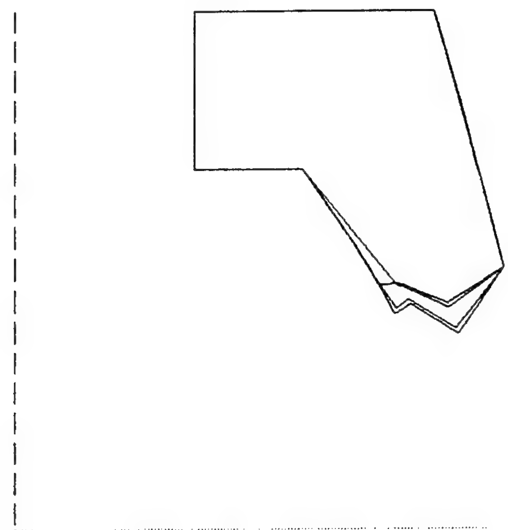
trans:	13.48	13.48	21.84	23.95	24.66	26.90	29.35	30.04	31.19	34.07	34.40	35.05	36.13	36.13
vert:	27.23	27.23	27.23	24.23	23.20	20.01	16.26	16.71	15.80	15.24	15.70	16.88	18.65	18.65
trans:	36.89	36.53	36.17	36.01	35.65	35.29	34.92	34.92	33.78	31.74	31.67	13.48	13.48	
vert:	20.01	21.34	22.66	23.26	24.59	25.91	27.23	27.23	31.55	39.11	39.37	39.37	27.23	

Section at 361.00 aft

trans:	13.48	21.84	23.66	24.09	24.86	25.95	26.17	26.90	28.77	28.80	29.97	33.50	33.54	36.89
vert:	27.23	27.23	24.64	24.03	22.92	21.37	21.05	20.01	16.61	16.56	17.32	15.05	15.12	20.01
trans:	36.55	36.22	35.94	35.60	35.27	34.93	34.92	33.77	31.67	13.48	13.48			
vert:	21.26	22.49	23.51	24.75	25.99	27.23	27.23	31.57	39.37	39.37	27.23			



COMP_W.S Isometric Projection



Stbd

COMP_W.S Body Plan (1 component)
Scale = 1:150

Component 1: COMP_W.S 98.50% permeability

Offsets in Feet. Read across --->

Section at 361.00 aft

trans:	13.48	21.84	23.66	24.09	24.86	25.95	26.17	26.90	28.77	28.80	29.97	33.50	33.54	36.89
vert:	27.23	27.23	24.64	24.03	22.92	21.37	21.05	20.01	16.61	16.56	17.32	15.05	15.12	20.01
trans:	36.55	36.22	35.94	35.60	35.27	34.93	34.92	33.77	31.67	13.48	13.48			
vert:	21.26	22.49	23.51	24.75	25.99	27.23	27.23	31.57	39.37	39.37	27.23			

Section at 365.04 aft

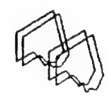
trans:	13.48	21.84	23.53	24.15	24.95	25.78	26.10	26.90	27.15	28.86	29.79	29.90	29.94	30.19
vert:	27.23	27.23	24.83	23.94	22.79	21.62	21.15	20.01	19.51	17.02	17.63	17.56	17.59	17.39
trans:	33.34	36.89	33.73	31.67	13.48	13.48								
vert:	15.51	20.01	31.74	39.37	39.37	27.23								

Section at 378.08 aft

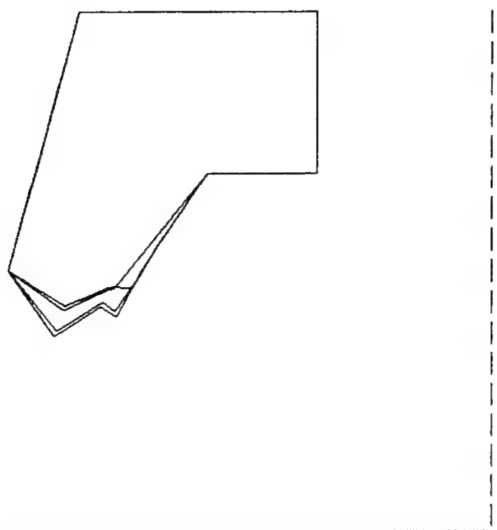
trans:	13.48	21.84	21.84	21.85	28.96	29.11	29.19	29.22	32.72	33.09	36.89	36.81	33.43	31.80
vert:	27.23	27.23	27.23	27.22	18.61	18.64	18.60	18.62	17.04	17.22	20.01	20.32	32.85	38.88
trans:	31.67	13.48	13.48											
vert:	39.37	39.37	27.23											

Section at 381.00 aft

trans:	13.48	21.84	21.84	23.38	23.69	24.22	25.25	25.47	26.18	27.54	27.92	29.09	29.41	30.53
vert:	27.23	27.23	27.23	25.04	24.59	23.83	22.37	22.06	21.04	18.72	18.75	18.84	18.71	18.25
trans:	30.74	32.62	32.69	32.73	35.03	35.60	36.87	36.89	36.80	33.33	31.83	31.67	13.48	13.48
vert:	18.15	17.37	17.34	17.37	18.83	19.24	20.00	20.01	20.33	33.22	38.77	39.37	39.37	27.23



COMP_W.P Isometric Projection



Port

COMP_W.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_W.P 98.50% permeability

Offsets in Feet. Read across --->

Section at 361.00 aft

trans:	13.48	21.84	23.66	24.09	24.86	25.95	26.17	26.90	28.77	28.80	29.97	33.50	33.54	36.89
vert:	27.23	27.23	24.64	24.03	22.92	21.37	21.05	20.01	16.61	16.56	17.32	15.05	15.12	20.01
trans:	36.55	36.22	35.94	35.60	35.27	34.93	34.92	33.77	31.67	13.48	13.48			
vert:	21.26	22.49	23.51	24.75	25.99	27.23	27.23	31.57	39.37	39.37	27.23			

Section at 365.04 aft

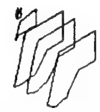
trans:	13.48	21.84	23.53	24.15	24.95	25.78	26.10	26.90	27.15	28.86	29.79	29.90	29.94	30.19
vert:	27.23	27.23	24.83	23.94	22.79	21.62	21.15	20.01	19.51	17.02	17.63	17.56	17.59	17.39
trans:	33.34	36.89	33.73	31.67	13.48	13.48								
vert:	15.51	20.01	31.74	39.37	39.37	27.23								

Section at 378.08 aft

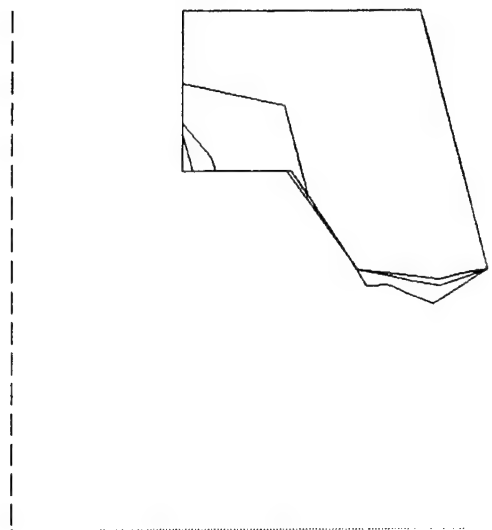
trans:	13.48	21.84	21.84	21.85	28.96	29.11	29.19	29.22	32.72	33.09	36.89	36.81	33.43	31.80
vert:	27.23	27.23	27.23	27.22	18.61	18.64	18.60	18.62	17.04	17.22	20.01	20.32	32.85	38.88
trans:	31.67	13.48	13.48											
vert:	39.37	39.37	27.23											

Section at 381.00 aft

trans:	13.48	21.84	21.84	23.38	23.69	24.22	25.25	25.47	26.18	27.54	27.92	29.09	29.41	30.53
vert:	27.23	27.23	27.23	25.04	24.59	23.83	22.37	22.06	21.04	18.72	18.75	18.84	18.71	18.25
trans:	30.74	32.62	32.69	32.73	35.03	35.60	36.87	36.89	36.80	33.33	31.83	31.67	13.48	13.48
vert:	18.15	17.37	17.34	17.37	18.83	19.24	20.00	20.01	20.33	33.22	38.77	39.37	39.37	27.23



COMP_X.S Isometric Projection



COMP_X.S Body Plan (1 component)
Scale = 1:150

Component 1: COMP_X.S 98.50% permeability

Offsets in Feet. Read across --->

Section at 381.00 aft

trans:	13.48	21.84	21.84	23.38	23.69	24.22	25.25	25.47	26.18	27.54	27.92	29.09	29.41	30.53
vert:	27.23	27.23	27.23	25.04	24.59	23.83	22.37	22.06	21.04	18.72	18.75	18.84	18.71	18.25
trans:	30.74	32.62	32.69	32.73	35.03	35.60	36.87	36.89	36.80	33.33	31.83	31.67	13.48	13.48
vert:	18.15	17.37	17.34	17.37	18.83	19.24	20.00	20.01	20.33	33.22	38.77	39.37	39.37	27.23

Section at 391.11 aft

trans:	13.48	13.48	21.61	21.84	22.57	23.29	25.45	26.18	26.90	29.01	31.12	33.23	34.45	36.89
vert:	27.23	27.23	27.23	27.23	26.20	25.17	22.08	21.04	20.01	19.52	19.08	18.69	19.17	20.01
trans:	35.91	35.42	34.94	34.92	32.81	32.44	31.67	13.48	13.48					
vert:	23.62	25.43	27.23	27.23	35.16	36.52	39.37	39.37	27.23					

Section at 396.98 aft

trans:	13.48	13.48	21.48	26.90	29.02	33.16	33.23	34.45	35.67	36.89	35.91	34.93	34.92	32.75
vert:	27.23	27.23	27.23	20.01	19.75	19.24	19.23	19.54	19.81	20.01	23.62	27.23	27.23	35.36
trans:	31.67	13.48	13.48											
vert:	39.37	39.37	27.23											

Section at 410.10 aft

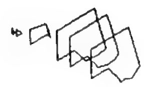
trans:	13.48	17.22	17.23	21.84	23.19	21.34	13.48	13.48
vert:	27.23	27.24	27.23	27.23	25.31	32.14	33.81	27.23

Section at 417.19 aft

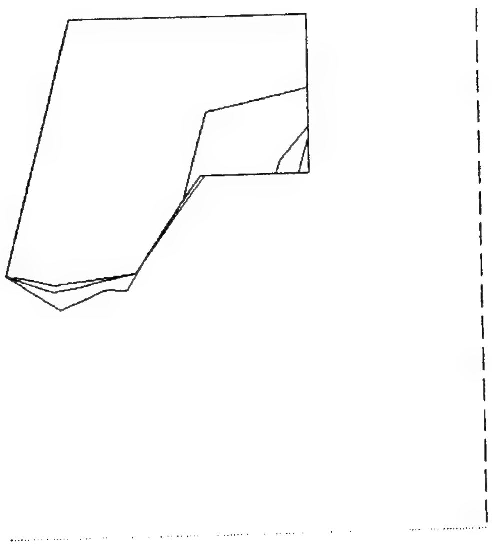
trans:	13.48	14.93	14.93	16.04	15.76	13.48	13.48
vert:	27.23	27.24	27.23	27.23	28.24	30.81	27.23

Section at 419.00 aft

trans:	13.48	13.48	13.68	14.34	13.49	13.48	13.48
vert:	27.23	27.23	27.23	27.24	29.99	30.04	27.23



COMP_X.P Isometric Projection



Port

COMP_X.P Body Plan (1 component)
Scale = 1:150

Component 1: COMP_X.P   98.50% permeability

Offsets in Feet. Read across --->

Section at 381.00 aft

trans:	13.48	21.84	21.84	23.38	23.69	24.22	25.25	25.47	26.18	27.54	27.92	29.09	29.41	30.53
vert:	27.23	27.23	27.23	25.04	24.59	23.83	22.37	22.06	21.04	18.72	18.75	18.84	18.71	18.25
trans:	30.74	32.62	32.69	32.73	35.03	35.60	36.87	36.89	36.80	33.33	31.83	31.67	13.48	13.48
vert:	18.15	17.37	17.34	17.37	18.83	19.24	20.00	20.01	20.33	33.22	38.77	39.37	39.37	27.23

Section at 391.11 aft

trans:	13.48	13.48	21.61	21.84	22.57	23.29	25.45	26.18	26.90	29.01	31.12	33.23	34.45	36.89
vert:	27.23	27.23	27.23	27.23	26.20	25.17	22.08	21.04	20.01	19.52	19.08	18.69	19.17	20.01
trans:	35.91	35.42	34.94	34.92	32.81	32.44	31.67	13.48	13.48					
vert:	23.62	25.43	27.23	27.23	35.16	36.52	39.37	39.37	27.23					

Section at 396.98 aft

trans:	13.48	13.48	21.48	26.90	29.02	33.16	33.23	34.45	35.67	36.89	35.91	34.93	34.92	32.75
vert:	27.23	27.23	27.23	20.01	19.75	19.24	19.23	19.54	19.81	20.01	23.62	27.23	27.23	35.36
trans:	31.67	13.48	13.48											
vert:	39.37	39.37	27.23											

Section at 410.10 aft

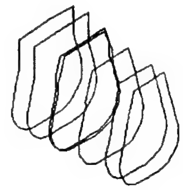
trans:	13.48	17.22	17.23	21.84	23.19	21.34	13.48	13.48
vert:	27.23	27.24	27.23	27.23	25.31	32.14	33.81	27.23

Section at 417.19 aft

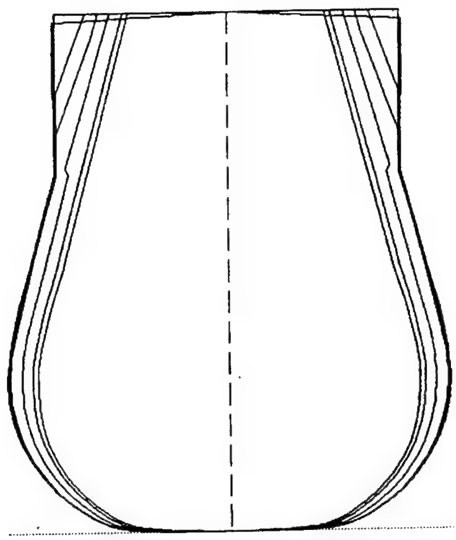
trans:	13.48	14.93	14.93	16.04	15.76	13.48	13.48
vert:	27.23	27.24	27.23	27.23	28.24	30.81	27.23

Section at 419.00 aft

trans:	13.48	13.48	13.68	14.34	13.49	13.48	13.48
vert:	27.23	27.23	27.23	27.24	29.99	30.04	27.23



COMP_D.C Isometric Projection



COMP_D.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_D.C 98.50% permeability

Offsets in Feet. Read across --->

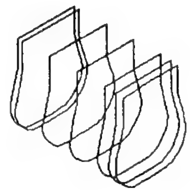
Section at	150.00 aft													
trans:	0.00	4.32	7.30	8.63	9.25	10.47	11.54	12.55	13.33	13.97	14.42	14.67	14.76	14.70
vert:	0.00	0.04	0.40	0.90	1.23	2.13	3.14	4.33	5.50	6.82	8.25	9.69	11.27	12.69
trans:	14.48	13.70	12.84	10.89	7.63	0.00								
vert:	14.11	17.25	19.94	27.23	39.37	39.37								
Section at	156.44 aft													
trans:	0.00	4.48	6.97	8.42	9.65	10.81	11.88	12.87	13.65	14.30	14.77	15.04	15.16	15.11
vert:	0.00	0.04	0.22	0.61	1.26	2.13	3.15	4.33	5.51	6.83	8.28	9.72	11.30	12.71
trans:	14.91	14.22	13.32	11.37	8.11	0.00								
vert:	14.13	17.04	19.94	27.23	39.37	39.37								
Section at	168.90 aft													
trans:	0.00	4.72	4.75	7.37	8.93	10.25	11.47	12.57	13.57	14.37	15.03	15.55	15.86	16.00
vert:	0.00	0.03	0.03	0.19	0.58	1.24	2.13	3.17	4.35	5.54	6.88	8.37	9.86	11.73
trans:	15.87	15.53	14.26	13.09	12.29	12.57	9.04	0.00						
vert:	13.47	15.21	19.95	24.28	27.23	27.68	39.37	39.37						

Section at	181.35 aft													
trans:	0.00	4.89	7.68	9.38	10.81	12.13	13.30	14.35	15.16	15.86	16.41	16.77	16.92	16.79
vert:	0.00	0.02	0.16	0.53	1.21	2.12	3.19	4.39	5.59	6.95	8.51	10.07	11.71	13.46
trans:	16.43	15.19	14.02	13.21	13.21	10.45	9.98	0.00						
vert:	15.20	19.96	24.29	27.23	30.33	37.61	39.37	39.37						

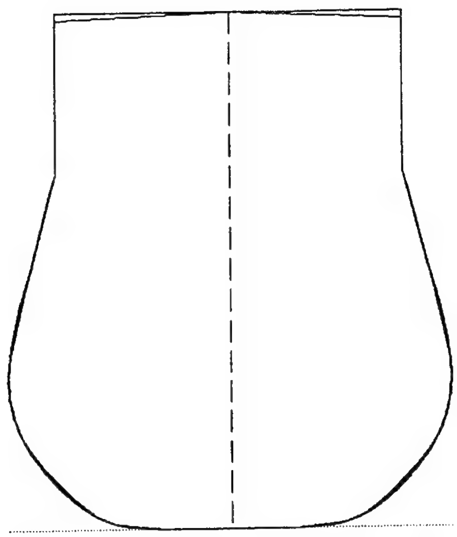
Section at	182.52 aft													
trans:	0.00	4.90	7.70	8.69	10.12	10.85	12.19	13.37	14.39	15.24	15.94	16.50	16.86	17.01
vert:	0.00	0.02	0.16	0.32	0.82	1.20	2.12	3.19	4.35	5.59	6.96	8.53	10.10	11.74
trans:	16.86	16.50	15.27	14.89	13.25	13.23	10.96	0.00						
vert:	13.51	15.28	19.96	21.39	27.23	33.37	39.37	39.37						

Section at	192.88 aft													
trans:	0.00	4.90	7.71	8.70	10.13	10.85	12.19	13.39	14.44	15.32	16.05	16.62	16.96	17.08
vert:	0.00	0.02	0.16	0.32	0.83	1.21	2.14	3.23	4.40	5.66	7.04	8.60	10.17	11.80
trans:	16.76	16.13	15.34	13.35	13.35	0.00								
vert:	14.54	17.24	19.98	27.23	39.37	39.37								

Section at	200.00 aft													
trans:	0.00	4.91	7.71	8.71	10.13	10.86	12.19	13.39	14.47	15.38	16.13	16.70	17.04	17.14
vert:	0.00	0.02	0.16	0.32	0.83	1.22	2.16	3.27	4.44	5.71	7.10	8.65	10.21	11.84
trans:	16.83	16.23	15.39	13.42	13.45	0.00								
vert:	14.56	17.27	19.99	27.23	38.75	39.37								



COMP_E.C Isometric Projection



COMP_E.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_E.C   98.50% permeability

Offsets in Feet. Read across --->

Section at 200.00 aft

trans:	0.00	4.91	7.71	8.71	10.13	10.86	12.19	13.39	14.47	15.38	16.13	16.70	17.04	17.14
vert:	0.00	0.02	0.16	0.32	0.83	1.22	2.16	3.27	4.44	5.71	7.10	8.65	10.21	11.84
trans:	16.83	16.23	15.39	13.42	13.42	0.00								
vert:	14.56	17.27	19.99	27.23	38.75	39.37								

Section at 203.24 aft

trans:	0.00	4.91	7.71	8.71	10.13	10.86	12.19	13.40	14.48	15.41	16.17	16.74	17.07	17.16
vert:	0.00	0.02	0.16	0.32	0.83	1.23	2.17	3.28	4.46	5.73	7.12	8.68	10.23	11.85
trans:	16.86	16.28	15.41	13.45	13.45	0.00								
vert:	14.57	17.28	20.00	27.23	39.37	39.37								

Section at 208.59 aft

trans:	0.00	4.91	7.71	8.70	10.12	10.85	12.17	13.38	14.47	15.41	16.18	16.76	17.07	17.16
vert:	0.00	0.02	0.16	0.33	0.84	1.24	2.19	3.30	4.49	5.77	7.16	8.70	10.24	11.85
trans:	17.00	15.41	13.46	13.46	0.00									
vert:	13.16	20.00	27.23	39.37	39.37									

Section at 221.63 aft

trans:	0.00	4.91	7.72	8.71	10.10	10.82	12.12	13.32	14.44	15.42	16.21	16.78	17.08	17.15
vert:	0.00	0.02	0.17	0.35	0.87	1.27	2.24	3.36	4.56	5.85	7.23	8.73	10.28	11.87
trans:	16.98	16.75	15.41	13.64	13.47	13.47	0.00							
vert:	13.58	14.64	20.00	26.59	27.23	39.37	39.37							

Section at 234.67 aft

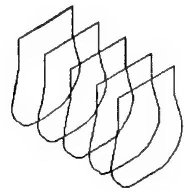
trans:	0.00	4.91	7.72	8.71	10.09	10.79	12.06	13.26	14.40	15.43	16.25	16.80	17.08	17.14
vert:	0.00	0.03	0.18	0.36	0.89	1.30	2.28	3.42	4.64	5.93	7.31	8.77	10.32	11.88
trans:	16.95	16.49	15.42	13.82	13.48	13.48	0.00							
vert:	14.01	16.13	20.00	25.95	27.23	39.37	39.37							

Section at 247.71 aft

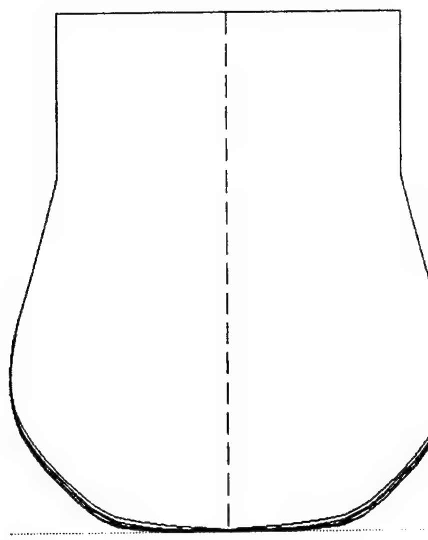
trans:	0.00	4.96	7.80	8.88	10.28	10.92	12.16	13.33	14.51	15.55	16.38	16.89	17.13	17.16
vert:	-0.00	0.03	0.24	0.42	1.00	1.42	2.45	3.61	4.85	6.12	7.50	8.95	10.48	12.01
trans:	16.96	16.50	15.42	13.61	13.48	13.48	0.00							
vert:	14.11	16.20	20.00	26.75	27.23	39.37	39.37							

Section at 250.00 aft

trans:	0.00	0.50	4.96	7.62	8.86	10.25	10.90	12.13	13.30	14.49	15.53	16.37	16.89	17.13
vert:	0.00	0.00	0.04	0.22	0.43	1.01	1.43	2.44	3.60	4.85	6.12	7.50	8.95	10.48
trans:	17.16	16.96	16.51	15.42	13.48	13.48	0.00							
vert:	12.01	14.11	16.20	20.00	27.23	39.37	39.37							



COMP_F.C Isometric Projection



COMP_F.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_F.C 98.50% permeability

Offsets in Feet. Read across --->

Section at 250.00 aft

trans:	0.00	0.50	4.96	7.62	8.86	10.25	10.90	12.13	13.30	14.49	15.53	16.37	16.89	17.13
vert:	0.00	0.00	0.04	0.22	0.43	1.01	1.43	2.44	3.60	4.85	6.12	7.50	8.95	10.48
trans:	17.16	16.96	16.51	15.42	13.48	13.48	0.00							
vert:	12.01	14.11	16.20	20.00	27.23	39.37	39.37							

Section at 260.74 aft

trans:	0.00	2.84	4.93	6.75	8.78	10.14	10.80	12.00	13.16	14.39	15.45	16.33	16.87	17.13
vert:	0.01	0.04	0.07	0.16	0.47	1.03	1.45	2.43	3.58	4.85	6.12	7.50	8.93	10.46
trans:	17.17	16.98	16.53	15.42	13.48	13.48	0.00							
vert:	11.99	14.10	16.20	20.00	27.23	39.37	39.37							

Section at 273.77 aft

trans:	0.00	2.74	4.81	6.47	8.40	9.44	10.92	11.48	12.75	13.71	15.04	15.84	16.56	16.99
vert:	0.04	0.09	0.15	0.23	0.52	0.88	1.73	2.16	3.34	4.32	5.80	6.88	8.22	9.66
trans:	17.16	17.14	16.92	16.54	15.42	13.48	13.48	0.00						
vert:	11.12	12.56	14.52	16.27	20.00	27.23	39.37	39.37						

Section at 286.81 aft

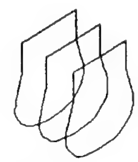
trans:	0.00	2.59	4.60	6.01	7.74	8.88	10.32	10.88	12.11	13.13	14.35	15.43	16.34	16.89
vert:	0.08	0.17	0.26	0.35	0.57	0.83	1.47	1.85	2.89	3.93	5.20	6.47	7.84	9.26
trans:	17.15	17.19	17.00	16.54	15.42	13.48	13.48	0.00						
vert:	10.77	12.27	14.31	16.35	20.01	27.23	39.37	39.37						

Section at 299.85 aft

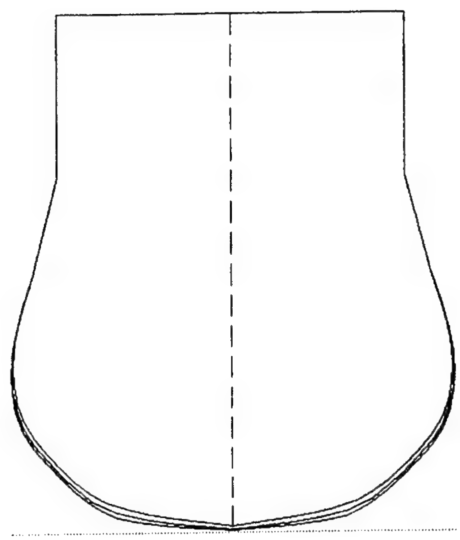
trans:	0.00	4.78	7.31	8.92	10.00	10.94	12.11	13.16	14.32	15.40	16.28	16.82	17.09	17.14
vert:	0.18	0.51	0.81	1.19	1.66	2.23	3.21	4.27	5.49	6.76	8.12	9.53	11.02	12.50
trans:	17.01	16.90	16.37	15.42	13.48	13.48	0.00							
vert:	14.16	14.79	17.00	20.01	27.23	39.37	39.37							

Section at 300.00 aft

trans:	0.00	4.79	7.30	8.92	10.00	10.94	12.11	13.16	14.32	15.40	16.28	16.82	17.09	17.14
vert:	0.18	0.51	0.81	1.19	1.66	2.23	3.21	4.27	5.49	6.76	8.12	9.54	11.02	12.51
trans:	17.01	16.90	16.36	15.42	13.48	13.48	0.00							
vert:	14.16	14.80	17.00	20.01	27.23	39.37	39.37							



COMP_G.C Isometric Projection



COMP_G.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_G.C 98.50% permeability

Offsets in Feet. Read across --->

Section at 300.00 aft

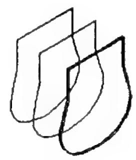
trans:	0.00	4.79	7.30	8.92	10.00	10.94	12.11	13.16	14.32	15.40	16.28	16.82	17.09	17.14
vert:	0.18	0.51	0.81	1.19	1.66	2.23	3.21	4.27	5.49	6.76	8.12	9.54	11.02	12.51
trans:	17.01	16.90	16.36	15.42	13.48	13.48	0.00							
vert:	14.16	14.80	17.00	20.01	27.23	39.37	39.37							

Section at 312.89 aft

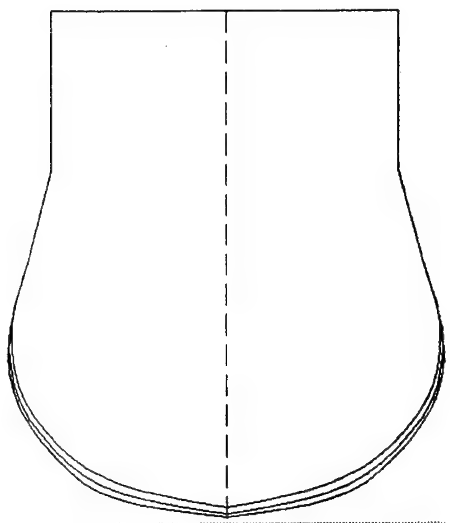
trans:	0.00	4.97	6.87	8.96	10.37	11.00	12.12	13.19	14.30	15.36	16.21	16.75	17.02	17.09
vert:	0.28	0.76	1.04	1.55	2.20	2.60	3.53	4.60	5.78	7.05	8.40	9.80	11.27	12.74
trans:	17.03	16.81	16.19	15.41	13.48	13.48	0.00							
vert:	14.01	15.28	17.64	20.01	27.23	39.37	39.37							

Section at 325.00 aft

trans:	0.00	4.97	6.85	8.09	9.81	11.10	12.19	13.25	14.32	15.30	16.10	16.63	16.91	17.00
vert:	0.51	1.15	1.48	1.80	2.43	3.16	4.04	5.08	6.25	7.46	8.79	10.17	11.60	13.04
trans:	16.99	16.83	16.40	15.41	13.48	13.48	0.00							
vert:	13.13	14.98	16.84	20.01	27.23	39.37	39.37							



COMP_H.C Isometric Projection



COMP_H.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_H.C 98.50% permeability

Offsets in Feet. Read across --->

Section at 325.00 aft

trans:	0.00	4.97	6.85	8.09	9.81	11.10	12.19	13.25	14.32	15.30	16.10	16.63	16.91	17.00
vert:	0.51	1.15	1.48	1.80	2.43	3.16	4.04	5.08	6.25	7.46	8.79	10.17	11.60	13.04
trans:	16.99	16.83	16.40	15.41	13.48	13.48	0.00							
vert:	13.13	14.98	16.84	20.01	27.23	39.37	39.37							

Section at 325.92 aft

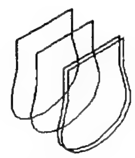
trans:	0.00	2.62	4.93	4.97	6.85	8.02	9.77	11.11	12.20	13.25	14.32	15.29	16.10	16.62
vert:	0.53	0.86	1.17	1.18	1.52	1.82	2.45	3.20	4.08	5.12	6.28	7.49	8.82	10.20
trans:	16.90	16.99	16.83	16.42	15.41	13.48	13.48	0.00						
vert:	11.63	13.06	14.96	16.78	20.01	27.23	39.37	39.37						

Section at 338.96 aft

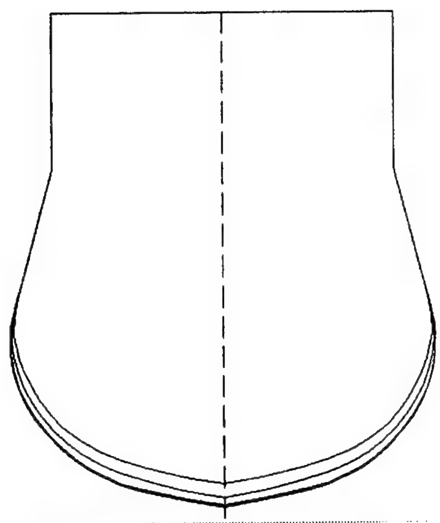
trans:	0.00	2.62	4.89	6.82	8.03	9.78	11.22	12.28	13.31	14.35	15.23	15.98	16.49	16.78
vert:	0.77	1.18	1.58	1.99	2.32	2.98	3.81	4.63	5.63	6.79	7.94	9.23	10.60	11.98
trans:	16.89	16.77	16.39	15.41	13.48	13.48	0.00							
vert:	13.39	15.15	16.91	20.01	27.23	39.37	39.37							

Section at 350.00 aft

trans:	0.00	2.82	3.17	6.37	8.02	8.28	10.66	11.89	12.95	13.96	14.85	15.59	16.15	16.51
vert:	1.28	1.78	1.84	2.52	2.98	3.08	4.16	4.98	5.91	6.97	8.08	9.28	10.56	11.89
trans:	16.70	16.67	16.32	15.41	13.48	13.48	0.00							
vert:	13.23	15.43	17.09	20.01	27.23	39.37	39.37							



COMP_J.C Isometric Projection



COMP_J.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_J.C 98.50% permeability

Offsets in Feet. Read across --->

Section at 350.00 aft

trans:	0.00	2.82	3.17	6.37	8.02	8.28	10.66	11.89	12.95	13.96	14.85	15.59	16.15	16.51
vert:	1.28	1.78	1.84	2.52	2.98	3.08	4.16	4.98	5.91	6.97	8.08	9.28	10.56	11.89
trans:	16.70	16.67	16.32	15.41	13.48	13.48	0.00							
vert:	13.23	15.43	17.09	20.01	27.23	39.37	39.37							

Section at 352.00 aft

trans:	0.00	2.86	6.29	8.01	10.56	11.82	12.89	13.89	14.78	15.52	16.09	16.46	16.67	16.68
vert:	1.37	1.89	2.62	3.10	4.22	5.05	5.96	7.00	8.11	9.29	10.56	11.87	13.20	14.71
trans:	16.65	16.31	15.41	13.48	13.48	0.00								
vert:	15.48	17.12	20.01	27.23	39.37	39.37								

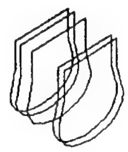
Section at 365.04 aft

trans:	0.00	3.10	5.77	8.00	9.89	11.35	12.46	13.43	14.33	15.06	15.68	16.15	16.44	16.58
vert:	1.97	2.61	3.24	3.88	4.64	5.46	6.29	7.22	8.28	9.34	10.51	11.76	13.01	14.27
trans:	16.53	16.22	15.41	13.48	13.48	0.00								
vert:	15.80	17.33	20.02	27.23	39.37	39.37								

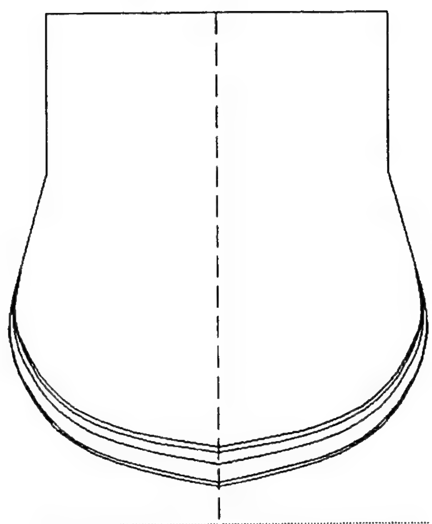
Section at 375.00 aft

trans:	0.00	2.96	5.78	8.02	9.94	11.40	11.66	12.75	13.67	14.47	15.07	15.65	16.05	16.41
vert:	3.03	3.61	4.25	4.87	5.64	6.46	6.66	7.52	8.46	9.47	10.46	11.61	12.75	14.74

trans:	16.38	16.11	15.41	13.48	13.48	0.00
vert:	16.14	17.55	20.02	27.23	39.37	39.37



COMP_K.C Isometric Projection



COMP_K.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_K.C 98.50% permeability

Offsets in Feet. Read across --->

Section at 375.00 aft

trans:	0.00	2.96	5.78	8.02	9.94	11.40	11.66	12.75	13.67	14.47	15.07	15.65	16.05	16.41
vert:	3.03	3.61	4.25	4.87	5.64	6.46	6.66	7.52	8.46	9.47	10.46	11.61	12.75	14.74
trans:	16.38	16.11	15.41	13.54	13.48	13.48	0.00							
vert:	16.14	17.55	20.02	27.00	27.23	39.37	39.37							

Section at 378.08 aft

trans:	0.00	2.92	5.79	8.02	9.95	11.42	12.54	13.46	14.29	14.89	15.50	15.93	16.21	16.36
vert:	3.35	3.91	4.56	5.18	5.95	6.77	7.61	8.51	9.51	10.45	11.56	12.67	13.77	14.88
trans:	16.33	16.08	15.41	13.54	13.48	13.48	0.00							
vert:	16.25	17.61	20.02	27.00	27.23	39.37	39.37							

Section at 391.11 aft

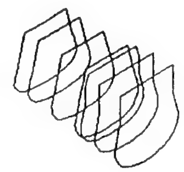
trans:	0.00	2.74	4.93	6.84	8.04	9.16	10.02	11.48	12.61	13.50	14.24	15.32	15.71	15.99
vert:	4.74	5.22	5.66	6.12	6.48	6.88	7.26	8.08	8.93	9.81	10.74	12.61	13.58	14.54
trans:	16.15	16.14	15.94	15.41	13.54	13.48	13.48	0.00						
vert:	15.50	16.70	17.90	20.02	27.00	27.23	39.37	39.37						

Section at 396.98 aft

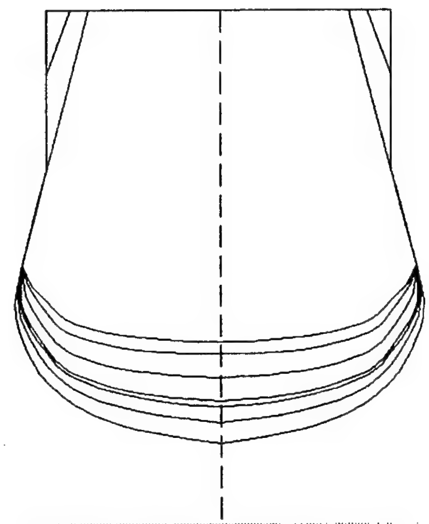
trans:	0.00	2.72	4.92	6.84	8.06	9.22	10.07	11.53	12.64	13.50	14.19	15.23	15.87	16.02
vert:	5.62	6.04	6.44	6.88	7.22	7.63	8.01	8.82	9.66	10.53	11.41	13.20	14.95	15.83
trans:	16.03	15.86	15.41	13.54	13.48	13.48	0.00							
vert:	16.94	18.05	20.02	27.00	27.23	39.37	39.37							

Section at 400.00 aft

trans:	0.00	2.55	4.91	6.69	8.07	8.97	9.90	11.42	12.42	13.32	14.02	14.96	15.67	15.92
vert:	6.11	6.48	6.88	7.27	7.64	7.95	8.34	9.13	9.87	10.72	11.59	13.15	14.85	15.85
trans:	15.97	15.81	15.41	13.54	13.48	13.48	0.00							
vert:	17.03	18.13	20.02	27.00	27.23	39.37	39.37							



COMP_L.C Isometric Projection



COMP_L.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_L.C 98.50% permeability

Offsets in Feet. Read across --->

Section at 400.00 aft

trans:	0.00	2.55	4.91	6.69	8.07	8.97	9.90	11.42	12.42	13.32	14.02	14.96	15.67	15.92
vert:	6.11	6.48	6.88	7.27	7.64	7.95	8.34	9.13	9.87	10.72	11.59	13.15	14.85	15.85
trans:	15.97	15.81	15.41	13.54	13.48	13.48	0.00							
vert:	17.03	18.13	20.02	27.00	27.23	39.37	39.37							

Section at 410.10 aft

trans:	0.00	1.99	3.62	4.89	6.17	8.12	9.35	11.06	11.69	12.71	13.46	14.07	14.99	15.57
vert:	7.77	7.96	8.16	8.35	8.58	9.03	9.42	10.18	10.56	11.37	12.18	12.99	14.52	15.89
trans:	15.75	15.66	15.41	14.10	13.54	13.48	13.48	0.00						
vert:	17.33	18.39	20.02	24.94	27.00	27.23	39.37	39.37						

Section at 417.19 aft

trans:	0.00	2.06	3.68	4.86	6.22	8.17	9.42	11.17	11.80	12.76	13.42	14.21	14.85	15.29
vert:	8.95	9.10	9.25	9.40	9.61	10.03	10.39	11.13	11.50	12.26	13.02	14.10	15.18	16.06
trans:	15.54	15.55	15.41	13.54	13.48	13.48	11.65	0.00						
vert:	16.94	18.55	20.02	27.00	27.23	34.51	39.37	39.37						

Section at 419.95 aft

trans:	0.00	2.19	3.81	4.85	6.19	8.19	9.45	11.21	11.85	12.77	13.40	14.16	14.79	15.22
vert:	9.40	9.54	9.67	9.81	10.01	10.41	10.77	11.48	11.85	12.59	13.33	14.38	15.42	16.25
trans:	15.47	15.50	15.41	14.42	13.54	13.48	10.23	0.00						
vert:	17.08	18.55	20.02	23.72	27.00	27.23	39.37	39.37						

Section at 431.61 aft

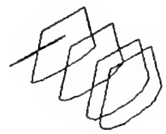
trans:	0.00	2.25	3.84	4.86	6.17	8.12	9.49	11.10	11.79	12.73	13.23	13.87	14.50	14.83
vert:	11.26	11.33	11.42	11.52	11.68	12.01	12.34	12.91	13.21	13.87	14.49	15.38	16.31	16.92
trans:	15.16	15.30	15.41	14.44	13.54	13.48	10.23	0.00						
vert:	17.63	18.78	20.01	23.67	27.00	27.23	39.37	39.37						

Section at 443.26 aft

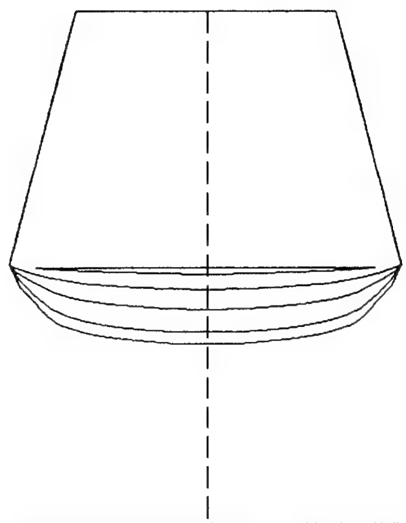
trans:	0.00	2.41	4.54	6.48	7.99	9.40	10.37	11.78	12.52	12.95	14.17	14.84	14.99	15.41
vert:	13.02	13.04	13.15	13.35	13.58	13.87	14.12	14.63	15.11	15.60	17.11	18.11	18.48	20.01
trans:	15.09	14.76	14.12	13.54	13.48	10.23	0.00							
vert:	21.23	22.45	24.86	27.00	27.23	39.37	39.37							

Section at 450.00 aft

trans:	0.00	2.38	4.43	6.29	7.71	9.11	10.04	11.41	12.15	12.60	13.82	14.60	14.81	15.41
vert:	13.98	14.00	14.11	14.29	14.50	14.76	14.97	15.41	15.81	16.20	17.45	18.33	18.66	20.01
trans:	15.09	14.76	14.12	13.54	13.48	10.23	0.00							
vert:	21.23	22.45	24.86	27.00	27.23	39.37	39.37							



COMP_M.C Isometric Projection



COMP_M.C Body Plan (1 component)
Scale = 1:150

Component 1: COMP_M.C 98.50% permeability

Offsets in Feet. Read across --->

Section at	450.00 aft													
trans:	0.00	2.38	4.43	6.29	7.71	9.11	10.04	11.42	12.15	12.60	13.82	14.61	14.81	15.41
vert:	13.98	14.00	14.11	14.29	14.50	14.76	14.97	15.41	15.81	16.20	17.45	18.33	18.67	20.01
trans:	15.09	14.76	14.12	13.48	11.33	10.23	0.00							
vert:	21.23	22.45	24.86	27.23	35.25	39.37	39.37							
Section at	456.30 aft													
trans:	0.00	2.36	4.32	6.11	7.45	8.83	9.73	11.07	11.80	12.27	13.50	14.39	14.64	15.41
vert:	14.89	14.89	15.01	15.18	15.35	15.60	15.77	16.14	16.47	16.77	17.77	18.55	18.84	20.01
trans:	15.09	14.76	14.12	13.48	11.33	10.23	0.00							
vert:	21.23	22.45	24.86	27.23	35.25	39.37	39.37							
Section at	469.33 aft													
trans:	0.00	3.09	5.56	7.51	10.31	12.04	13.10	14.11	14.91	15.41	14.85	14.30	13.75	13.48
vert:	16.56	16.62	16.79	17.00	17.42	17.92	18.44	18.98	19.51	20.01	22.10	24.17	26.22	27.23
trans:	10.23	0.00												
vert:	39.37	39.37												

Section at 483.02 aft

trans:	0.00	5.49	7.45	9.02	10.21	12.58	13.86	14.85	15.41	14.90	14.41	13.93	13.48	11.35
vert:	18.04	18.26	18.38	18.50	18.62	19.04	19.37	19.69	20.01	21.92	23.76	25.54	27.23	35.19

trans:	10.23	0.00
vert:	39.37	39.37

Section at 495.41 aft

trans:	0.00	4.00	9.36	12.23	13.36	0.00
vert:	19.22	19.32	19.48	19.61	19.69	19.69

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